REPORT RESUMES

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THE PREPARATION OF CURRICULUM MATERIALS AND THE DEVELOPMENT
OF TEACHERS FOR AN EXPERIMENTAL APPLICATION OF THE CLUSTER
CONCEPT OF VOCATIONAL EDUCATION AT THE SECONDARY SCHOOL
LEVEL. ~~VOLUME I, FINAL REPORT FOR PHASE II OF THE CLUSTER~~
~~CONCEPT PROJECT.~~
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DESCRIPTORS- *CURRICULUM DEVELOPMENT, CURRICULUM RESEARCH, TEACHER ATTITUDES, TEACHER BACKGROUND, *TEACHER EDUCATION, TEACHER EDUCATION CURRICULUM, *TRADE AND INDUSTRIAL EDUCATION, HIGH SCHOOLS, PILOT PROJECTS, INSTRUCTIONAL MATERIALS, *OCCUPATIONAL CLUSTERS, SUMMER WORKSHOPS, TEACHER SELECTION, *TEACHER PARTICIPATION, PROGRAM DEVELOPMENT,

THE RESULTS OF THE FIRST PHASE OF THE STUDY INDICATED THAT THE CLUSTER CONCEPT WAS AN ACCEPTABLE FORM OF VOCATIONAL EDUCATION AT THE SECONDARY SCHOOL LEVEL, AND PROVIDED A SERIES OF COURSE OUTLINES FOR THE OCCUPATIONAL CLUSTERS OF CONSTRUCTION, METAL FORMING AND FABRICATION, AND ELECTRO-MECHANICAL INSTALLATION AND REPAIR. THE SECOND PHASE AIMED TO DEVELOP TEACHERS CAPABLE OF IMPLEMENTING PILOT CLUSTER CONCEPT PROGRAMS AND A TEACHER PREPARATION CURRICULUM FOR SUCH PROGRAMS. ELEVEN TEACHERS WERE SELECTED ON THE BASIS OF STAFF EVALUATION TO PARTICIPATE IN THE PROGRAM. DURING THE SPRING SEMESTER, IN 16 SESSIONS, THEY DEVELOPED INSTRUCTIONAL PLANS FOR IMPLEMENTING THE PROGRAMS, REVIEWED AND EVALUATED INSTRUCTIONAL MATERIALS, AND ARRANGED THE CONTENT OF EACH CLUSTER INTO AN INSTRUCTIONAL SEQUENCE. DURING A 6-WEEK SUMMER WORKSHOP, THEY WORKED WITH INDUSTRIES TO DEVELOP THE TECHNICAL SKILLS AND KNOWLEDGE REQUIRED FOR IMPLEMENTING THE PROGRAMS AND PREPARED OCCUPATIONAL INFORMATION UNITS AND DEVELOPED INSTRUCTIONAL MATERIALS FOR EACH CLUSTER. AS AN OUTGROWTH OF EXPERIENCES AND OBSERVATIONS OF THE WORKSHOP SESSIONS, TEACHER PREPARATION CURRICULUM WAS DEVELOPED. MAJOR DIVISIONS WERE PROFESSIONAL COMPETENCY DEVELOPMENT FOR CLUSTER CONCEPT PROGRAMS, ORGANIZATION AND ADMINISTRATION, TECHNICAL COMPETENCY DEVELOPMENT, AND INSTRUCTIONAL MATERIALS DEVELOPMENT. EACH DIVISION CONSISTED OF UNITS CONTAINING PURPOSE, TIME, TOPICS, PROCEDURES AND ACTIVITES, AND RESOURCES. THE CURRICULUM IS INCLUDED. THREE OTHER VOLUMES (VT 004 163, VT 004 164, VT 004 165) PRESENT THE INSTRUCTIONAL PLANS FOR EACH OF THE OCCUPATIONAL CLUSTERS. (MM)

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FINAL REPORT
(One of Four Volumes)
Project No. 6-2312
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THE PREPARATION OF CURRICULUM MATERIALS AND THE DEVELOPMENT OF TEACHERS FOR AN EXPERIMENTAL APPLICATION OF THE CLUSTER CONCEPT OF VOCATIONAL EDUCATION AT THE SECONDARY SCHOOL LEVEL

Volume I

Final Report for Phase II of the
Cluster Concept Project

August 1967

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

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VT004162

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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THE PREPARATION OF CURRICULUM MATERIALS AND THE DEVELOPMENT OF TEACHERS FOR AN EXPERIMENTAL APPLICATION OF THE CLUSTER CONCEPT OF VOCATIONAL EDUCATION AT THE SECONDARY LEVEL

Project No. 6-2312
Grant No. OEG 2-7-062312-0175

Dr. Donald Maley
Principal Investigator

1967

The research reported herein was performed pursuant to a grant with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

University of Maryland
College Park, Maryland

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PREFACE

This final report presents the results of the second phase of the cluster concept project entitled: "The Preparation of Curriculum Materials and the Development of Teachers for an Experimental Application of the Cluster Concept of Vocational Education at the Secondary School Level." The project was initiated as a result of the findings and support obtained during the first phase of the project.

The first phase of the project, conducted from August 1965 to September 1966, was concerned with an investigation and development of the cluster concept as a program in vocational education. The initial research effort was aimed at determining the acceptability and feasibility of the cluster concept approach as well as identifying occupational clusters. The final part of the first phase study was directed toward developing a series of course outlines for the selected clusters.

The results of phase I indicated the cluster concept was an acceptable form of vocational education at the secondary school level. The general reaction obtained from individuals representing management, labor, and education indicated the cluster concept was feasible and could be implemented at the secondary schools with little difficulty. A group of three occupational clusters were then identified and an analysis was made of the occupations within each cluster. The results of the research provided a series of course outlines for the occupational clusters of: (1) construction; (2) metal forming and fabrication; and (3) electro-mechanical installation and repair.

The second phase of the project was aimed at the development of teachers capable of implementing pilot cluster concept programs. During the first part of the project a group of teachers was selected for implementing pilot programs. The remaining portion of the year was spent in developing the professional and technical competencies of the selected teachers.

The final report of the project is presented in four volumes. The first volume is a three-part report. The first section discusses the selection of teachers for implementing pilot programs. The second section presents the activities and results of the teacher preparation program. The third section presents the teacher preparation curriculum for the cluster concept programs.

The other three volumes of the report present the instructional plans for each of the occupational clusters. The instructional plans were prepared by the teachers and are intended to be used in the implementation of pilot cluster concept programs.

The research was performed by a research team under the direction of Dr. Donald Maley, Professor and Head of the Industrial Education Department at the University of Maryland. The project was coordinated by Mr. Nevin R. Frantz, Jr. In addition to the project staff, many other individuals (see Appendix K) contributed significantly to the project in a variety of ways. Their efforts on behalf of the project are gratefully acknowledged.

PERSONNEL FOR THE PROJECT

The following personnel were involved in the research and development of the second phase of the cluster concept program:

PRINCIPAL INVESTIGATOR

Dr. Donald Maley

PROJECT COORDINATOR

Mr. Nevin Frantz, Jr.

RESEARCH ASSISTANTS

Mr. Edwin Boyer

Mr. Kenvyn Richards

Mr. Andrew Baron

GRADUATE ASSISTANTS

Mr. Luther Burse

Mr. Thomas Jones

Mr. Joseph Abromitis

Mr. Richard Spahr

SECRETARIES

Mrs. Rose Marie Dorn

Mrs. Nancy Bunch

Mrs. Betty Wilson

ACTIVITIES OF THE PROJECT

The following is a listing of activities engaged in by the project staff:

1. A series of meetings were initially held with industrial education supervisors in the Maryland counties of Prince Georges, Frederick, Montgomery and Washington in order to discuss the purpose of the second phase project.
2. A series of meetings was held with teachers recommended for the pilot cluster concept program by the industrial education supervisors.
3. A number of visits were made to the U.S. Department of Labor, National Education Association, Office of Economic Opportunity and various military branches of the service for information concerning the identification of teacher competencies.
4. Seminars and discussion groups were held periodically to clarify the direction of the project and develop procedures for accomplishing special objectives.
5. A series of meetings was held with county school principals, high school principals, participating teachers and guidance counselors in order to discuss the implementation of pilot cluster concept programs.
6. Conferences were held with a number of industrial organizations in order to obtain training programs for the purpose of developing the technical competencies of the participating teachers.

7. Numerous contacts were made with instructional media representatives in order to obtain demonstrations of instructional materials.
8. A video-tape presentation of the cluster concept project was made for utilization in curriculum classes at the University of Maryland.
9. The project was formally presented by the principal investigator, project coordinator, and research assistants to individuals from the county boards of education, local school officials, and graduate classes at the University of Maryland.
10. Information about the project has been forwarded to approximately 150 individuals who have corresponded with the principal investigator and project coordinator during the past year.
11. A collection of textbooks, charts, phamphlets, film sources and other instructional materials has been collected for use in the implementation of pilot programs.
12. The teacher-trainees for the metal forming and fabrication cluster received technical training from the experimental engineering and fabrication division of the Goddard Space Flight Center during the Summer workshop session.
13. The teacher-trainees for the construction cluster received technical training from member firms of the Associated Builders and Contractors, Incorporated.

14. The teacher-trainees for the electro-mechanical installation and repair cluster received technical training from consultants representing: (1) The Westinghouse Appliance Sales and Service Center; (2) Sylvania Electric Products, and; (3) The National Training Center of the Remington-Rand Office Machines.

ABSTRACT OF THE PROJECT

TITLE: The Preparation of Curriculum Materials and the Development of Teachers for an Experimental Application of the Cluster Concept of Vocational Education at the Secondary School Level.

CONTRACT NUMBER: OEG 2-7-062312-0175

PRINCIPAL INVESTIGATOR: Dr. Donald Maley

INSTITUTION: Industrial Education Department
University of Maryland
College Park, Maryland

DURATION: September 1, 1966 to August 31, 1967

OBJECTIVES: The following objectives were identified for the project:

1. To select a group of teachers capable of implementing pilot cluster concept programs.
2. To plan and develop a teacher preparation curriculum for cluster concept programs.
3. To develop a group of teachers for experimental application of the cluster concept of vocational education at the secondary school level.

ACTIVITIES: The initial phase of the project was devoted to the selection of teachers capable of implementing pilot cluster concept programs. Meetings were held with industrial education supervisors representing four county school systems in the State of Maryland. The supervisors recommended a group of thirty teachers who were considered qualified for implementing pilot cluster concept programs. The recommended teachers were further evaluated by the project staff in terms of their teaching competencies, ability to accept new ideas, educational background and occupational experience. A panel of

individuals, consisting of the county industrial education supervisors, the assistant director of vocational education for the Maryland State Department of Education, the principal investigator, and project coordinator, made the final selection of teachers based upon the evaluations obtained by the project team. The procedure resulted in the selection of eleven teachers to implement pilot programs for the occupational clusters of: (1) construction; (2) electro-mechanical installation and repair; and (3) metal forming and fabrication.

A teacher preparation program was developed and initiated during the Spring semester at the University of Maryland. During this time, the teacher-participants were engaged in the following activities: (1) developing instructional plans for implementing pilot programs; (2) reviewing and evaluating instructional materials; and (3) arranging the content for each cluster in an instructional sequence.

During the Summer, the teachers participated in a six-week workshop at the University of Maryland. The major purpose of the workshop was to: (1) develop the technical skills and knowledge required for implementing the cluster concept programs; (2) prepare occupational information units for each cluster; and (3) develop instructional materials for each of the occupational clusters. The participating teachers engaged in a cooperative program with local and national industrial organizations to develop the technical competencies for their respective cluster. The remaining portion of time was spent in developing instructional materials and occupational information units.

RESULTS: The results of the project indicate the following items have been accomplished:

1. The selection and preparation of eleven teachers with the technical and professional capabilities of implementing pilot cluster concept programs.
2. The development of a teacher preparation curriculum suitable for preparing teachers for cluster concept programs.
3. The preparation of instructional plans for utilization in the implementation of pilot cluster concept programs.
4. The collection and development of instructional materials for use in the implementation of pilot cluster concept programs.

PART I

THE SELECTION OF TEACHERS FOR PILOT CLUSTER CONCEPT PROGRAMS

Introduction

During the first phase of the project, supervisors of industrial education in the school systems of Prince Georges, Montgomery, Frederick, and Washington Counties expressed an interest in initiating pilot cluster concept programs in vocational education. The superintendents in these counties supported the project and extended their approval and cooperation for implementing pilot programs in the secondary schools during the Fall of 1967. The support provided by the four county school systems in Maryland indicated that a group of teachers could be selected and prepared for the implementation of pilot programs.

As a result of the cooperation received from the four county school systems, a project was initiated by the Industrial Education Department at the University of Maryland to select and prepare teachers for pilot cluster concept programs.

The objectives of the project were the following:

A. The selection of teachers capable of implementing pilot cluster concept programs.

B. The development of a teacher education program for the purpose of preparing teachers for cluster concept programs.

C. The preparation of selected teachers for the conduct of pilot cluster concept programs in vocational education.

The primary concern during the first part of the second phase of the project* was the selection of teachers capable of implementing pilot cluster concept programs. In order to accomplish this objective, a group of interested and qualified teachers were needed for participation in the program. A selection procedure was also considered necessary in making the final identification of teachers for pilot cluster concept programs. The major purpose of the selection procedure was the identification of three competent teachers from each of the four counties participating in the program. Each county would operate pilot programs for the occupational clusters identified in phase I of the project. These clusters were: (1) construction; (2) metal forming and fabrication; and (3) electro-mechanical installation and repair.

Initial Selection Procedure

Meetings were held in September of 1966 with industrial education supervisors and superintendents of schools in each of the four counties participating in the program. The meetings were used to outline the activities of the project and obtain names of teachers for possible participation in the program. After the meetings, the supervisors submitted names of industrial education teachers who would be interested in the program and who possessed basic competencies in one or more of the occupational clusters. The names of the recommended teachers were submitted to the project coordinator by the industrial education supervisors. Meetings were then held with the recommended teachers in each county. The purposes of the meeting were to: (1) provide each

*Hereafter this project will be referred to as phase II of the cluster concept project.

prospective teacher with a better understanding of the cluster concept project; (2) acquaint the teachers with the results of phase I; and (3) provide each teacher with information about the activities of phase II. During the meeting, each teacher was requested to complete an information sheet (see Appendix A) which was designed to obtain knowledge about previous educational and occupational experiences.

An area of major concern during the initial period of teacher selection was the development of procedures and instruments that could be used to make a final selection of teachers for the pilot programs. The primary aim of this activity was the identification of one or more instruments that could be used in evaluating the capabilities of each teacher recommended for the program. The data collected by the instruments could then be used in making an impartial and objective selection of teachers.

Identification and Development of Selection Instruments

The identification of instruments for teacher selection was concentrated in two areas. These areas were: (1) the determination of teacher competencies; and (2) the measurement of an individual's willingness to accept new ideas. The identification of an instrument to measure willingness to accept new ideas was considered important since the project was an innovation in vocational education and the participating teachers would be accepting and utilizing new concepts in teaching the occupational clusters. The following procedures were utilized in obtaining information about measuring teacher competencies, predicting teaching effectiveness, and measuring a person's willingness to accept new ideas:

1. A review of literature was made to identify teacher competencies that might be measured by an objective instrument.
2. A review of Buros' Mental Measurement Yearbook[1] was made to identify suitable instruments that would measure teacher competencies, predict teaching success, and willingness to accept new ideas.
3. Letters were sent to commercial testing firms for information pertaining to instruments that would measure teacher competencies, predict teaching success, and willingness to accept new ideas.
4. Letters requesting information about teacher selection procedures and trade competency tests were sent to state directors of vocational education.
5. Individuals representing the U.S. Department of Labor, National Education Association, Office of Economic Opportunity, and various military branches of service were contacted for information concerning methods of selecting instructors and evaluating their performance.
6. Requests for information were sent to researchers working in the area of teacher competencies.

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[1] O.K. Buros, The Sixth Mental Measurement Yearbook (Highland Park, New Jersey: Grayphon Press, 1965).

The major conclusion reached after pursuing information about instruments and techniques for measuring teacher competencies and willingness to change is summarized in the following quotation from a letter received from Dr. Donald M. Medley, Head, Teacher Behavior Research, Educational Testing Service: " . . . no instrument exists (so far as I know) that has been properly validated for either purpose . . ."

A conference with Dr. James Raths, Director of the Bureau of Educational Research and Field Services at the University of Maryland and researcher in the area of effective teacher behavior, supported the opinion of Dr. Medley. Dr. Raths suggested the utilization of an interview schedule based on research reported by Dr. Nathaniel C. Gage of Stanford University.[2] An instrument for measuring cognitive rigidity and flexibility, the Rokeach Dogmatism Scale,[3] was also suggested by Dr. Raths. As a result of the conference, the research team began developing an interview schedule to measure teacher competencies and initiated an evaluation of the Rokeach Dogmatism Scale.

Interview Schedule

The interview schedule was based on research reported by Gage. The following items were identified by Gage as characteristic of successful teachers:

A. Committment to Teaching - A teacher's interest and enthusiasm for teaching.
B. Warmth - The tendency of a teacher to be approving, to provide emotional support, to express a sympathetic attitude to accept the feelings of pupils.

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[2] Nathaniel C. Gage, "Desirable Behaviors of Teachers," Teachers for the Disadvantaged (editors, M.D. Usdan and F. Bertolaet, Chicago: Follet Publishing Company, 1966).

[3] Milton Rokeach, The Open and Closed Mind (New York: Basic Books, Incorporated, 1960).

C. Cognitive Organization - A teacher should possess and exhibit the intellectual grasp of his subject matter. Such a teacher understands the processes and concepts of his subject. He carries with him a set of 'organizers' for his subject matter that provides him, and so his pupils, with "relevant ideational scaffolding" that discriminates new materials from the previously learned and integrates it at a level of abstraction, generality, and inclusiveness which is higher than that of the learning material itself.

D. Orderliness - By 'orderliness' we mean the teacher's tendency to be systematic and methodical in his self-management.

E. Indirectness - A tendency toward indirect methods of teaching consists in giving pupils opportunities to engage in overt behaviors, such as talking and problem solving, relevant to the learning objectives rather than merely listening to their teacher and to discover ideas and solutions to problems rather than merely receiving them from the teacher.

F. Ability to solve instructional problems - By 'ability to solve instructional problems' we mean the teacher's ability to solve problems unique to his work in a particular subdivision of the profession.[4]

The interview schedule format was based upon a form developed by Haberman.[5] The questions on the schedule were derived from a review of literature in the area of teacher competency in industrial education. A list of fifty questions were developed by the project team. The questions were then reviewed and analyzed by members of the project staff. The analysis was aimed at the selection of two questions for each teacher characteristic reported by Gage.[6] Each question was carefully reviewed in terms of its relationship to the six teacher characteristics. Those questions which appeared to best reflect the competencies reported by Gage were selected for the interview schedule. This procedure resulted in the selection of twelve questions for the interview schedule. Ten of the questions were written to reflect the competencies reported by Gage. Two additional questions were used to focus on special problems and interests connected with the cluster concept project.

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[4] Gage, loc. cit.

[5] Martin Haberman, "Interview Form" (Milwaukee: School of Education, University of Wisconsin, Milwaukee, 1963), mimeographed.

[6] Gage, loc. cit.

After completing the questions, a scoring procedure was developed that would indicate acceptable and unacceptable answers. A rating scale from zero to ten was made to assist the interviewer in assigning a value to each answer or response. It was assumed that a non-committal answer would be rated as five and would only deviate from that point on the scale as the respondent touched on the acceptable or unacceptable answers.

Several procedures were initiated after constructing the instrument to examine the effectiveness of the schedule. The schedule was first submitted to two members of the industrial education department in order to determine the appropriatness of the questions and their respective answers. After making preliminary adjustments as a result of the review, the schedule was submitted to a class in educational measurement. Additional refinements were made after reviewing the classes' comments. The instrument was again reviewed by the project staff.

The next procedure involved each member of the project staff making a recorded interview with a graduate student in the industrial education department. The research team then listened to the tape recordings and rated each answer to the questions on the schedule. The purpose of this step was to: (1) gain familiarity with the use of the instrument; (2) establish inter-rater reliability; and (3) make any further refinements in the interview schedule which were considered necessary.

The Kendall Coefficient of Concordance (w), as described by Siegel,[7] was used to determine the correlation among the project team members ratings. In order to use Kendall's Coefficient of Concordance, the team ratings were changed to rank order for each team member. Coefficients of concordance were then calculated for each of the fourteen questions on the interview schedule as shown in Table I. The coefficients for each question were tested for significance at the .05 level. The analysis of data provided evidence the project team was making similar ratings on responses to the interview schedule. The results obtained from applying the procedures used to develop the interview schedule indicated the instrument was suitable for collecting information about teacher competencies.

TABLE I

COEFFICIENTS OF CONCORDANCE FOR RANKINGS ON INTERVIEW SCHEDULE QUESTIONS

Question Number	Coefficient of Concordance	Question Number	Coefficient of Concordance
1	0.74	8	0.70
2	0.68	9	0.69
3	0.61	10	0.66
4	0.77	11	0.86
5	0.88	12	0.78
6	0.83	13	0.74
7	0.79	14	0.84

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[7] Sidney Siegel, Nonparametric Statistics for the Behavioral Sciences (New York: McGraw-Hill Book Company, Incorporated, 1956), pp. 229-239.

Interviews were then conducted with each teacher recommended for the program. The project team conducted the interviews and recorded the proceedings on tape. The tape recorded interviews were replayed and members of the project team rated the teacher responses to each question. (see Appendix B). The ratings for each question were added to obtain a total score. The scores for each question were added to obtain a total for the interview. This value was divided by the number of raters to obtain a mean rating for each teacher as shown in Table II.

After collecting and analyzing the data obtained from the interview schedule, the Rokeach Dogmatism Scale was administered to the teachers. An investigation and analysis of the scale was initially made in order to determine its appropriateness in selecting teachers for the cluster concept program.

Rokeach Dogmatism Scale

The Rokeach Dogmatism Scale, Form E, was analyzed using criteria from a list developed by Cronbach.[8] The criteria included: (1) description of the scale; (2) validity; and (3) reliability.

The Rokeach Dogmatism Scale, Form E, consists of forty-two items which measure individual differences in open or closed belief systems. The items are statements of beliefs held by different people. An individual is asked to indicate the extent to which he agrees or disagrees with the statements. The strength of a person's reaction is interpreted as falling along a continuum from "strongly agree" to "strongly disagree." Some characteristics at the extremes of the continuum are shown below.[9]

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[8] Lee J. Cronbach, Essentials of Psychological Testing (second edition, New York: Harper and Brothers Publishers, 1960), p. 148.

[9] Rokeach, op. cit., p. 72.

TABLE II

INTERVIEW SCHEDULE RATINGS FOR PROSPECTIVE CLUSTER CONCEPT TEACHERS

Teacher Number	Mean Rating	Percentile Rank
1	8.2	98
2	7.8	95
3	7.7	91
4	7.3	87
5	7.1	81
6	7.1	81
7	7.0	75
8	6.7	71
9	6.7	71
10	6.4	66
11	6.3	62
12	6.0	57
13	6.0	57
14	6.0	57
15	6.0	57
16	5.9	43
17	5.9	43
18	5.9	43
19	5.8	37
20	5.7	34
21	5.4	30
22	5.3	22
23	5.3	22
24	5.3	22
25	5.3	22
26	5.3	22
27	4.7	12
28	4.6	6
29	4.6	6
30	4.6	6

Low Score	High Score
1. Magnitude of rejection of beliefs with which you do not agree is relatively low (not strong).	1. Magnitude of rejection of beliefs with which you do not agree is relatively high (strong).
2. Beliefs to the effect that the world one lives in, or the situation one is in at a particular moment, is a friendly one.	2. Beliefs to the effect that the world one lives in, or the situation one is in at a particular moment, is a threatening one.
3. Beliefs about authority and about people who hold to systems of authority are to the effect that authority is not absolute and that people are not to be evaluated (if they are to be evaluated at all) according to their agreement with such authority.	3. Beliefs about authority and about people who hold to systems of authority are to the effect that authority is absolute and that people are to be accepted and rejected according to their agreement or disagreement with such authority.

The reliability, as reported by Rokeach, was determined by administering the instrument to college students, English automobile plant workers, and residents at a veterans administration domiciliary.[10] The data obtained from these sources were analyzed by applying the Spearman-Brown split-halves formula. The reliability coefficient obtained by this method ranged from 0.68 to 0.93. The college student samples had reliability coefficients ranging from 0.68 to 0.85, while the English worker sample was found to be 0.78. The reliability for the veterans administration domiciliary samples was 0.93 and 0.84.[11]

The validity of the scale was determined by the "method of known groups."[12] Two studies were conducted to assess the validity of the instrument with respect to general authoritarianism and intolerance. In study I, college professors selected a sample of graduate students they regarded as most and least dogmatic. Data were collected on thirteen subjects judged by the professors to be high and sixteen subjects judged to be low in dogmatism. An analysis of the results showed no differences between the two criterion groups. The criterion groups were also given the Berkeley Measures of Authoritarianism and Intolerance and their scores did not differ on these measures.[13]

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[10] Ibid., pp. 89-97.

[11] Ibid.

[12] Ibid., p. 101.

In the second study, graduate students in psychology selected high and low dogmatic subjects among their personal friends. The instrument was administered to twenty subjects, ten judged to be high and ten low in dogmatism. An analysis of the results indicated the high dogmatic subjects scored significantly higher than the low dogmatic subjects on the scale. An administration of the Berkeley Measures of Authoritarianism was also given to the subjects. An analysis of the results indicated the dogmatic group scored higher than the low dogmatic group on these scales.[14]

The selection of the dogmatism scale for determining cognitive rigidity and flexibility coefficients was considered satisfactory since the scale consists of a broad range of items that appear to be unrelated to each other. An item analysis of the scale indicated the subjects were agreeing and disagreeing in a consistent manner. The analysis also demonstrated that subjects scoring in the upper and lower quarters of the frequency distribution differed consistently in a statistically significant manner on a majority of items. The validity studies disclosed two contrasting results with respect to measurement of dogmatism and intolerance. The study utilizing peer judges of dogmatism obtained significantly different scores for high and low scoring subjects. No differences in scale scores were found when professors judged high and low dogmatism subjects. The results indicate that professors may be poor judges of the variables they were asked to identify in the subjects. Graduate students in study II were better judges of subjects possessing the characteristics. The results of the Berkeley Measures tend to support this conclusion and provides evidence that the Rokeach Scale was performing the same function as the Berkeley Measure in distinguishing between high and low dogmatic groups.

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[13] Ibid., p. 107.

[14] Ibid.

As a result of the supporting research evidence, the Rokeach Dogmatism Scale, Form E, was selected for use in determining teachers for pilot cluster concept programs. Permission to use the instrument was obtained from the author, Dr. Milton Rokeach, Professor of Psychology at Michigan State University. Dr. Rokeach also suggested placing detractor items at random among the forty-two items in the scale. A series of items were developed and reviewed by the project staff for inclusion in the instrument. After carefully analyzing the content of each item, a group of eighteen items was selected and placed at random in the scale.

The instrument was administered to a group of industrial education teachers recommended by the supervisors from each cooperating county. The scales were then scored and statistically analyzed to determine the mean, standard deviation, and percentile rank. The derived mean for the thirty scores was 143.00 with a standard deviation of 24.60. The percentile rank of each teacher is shown in Table III.

TABLE III

SCORES AND PERCENTILE RANK OF THIRTY INDUSTRIAL EDUCATION TEACHERS ON THE ROKEACH DOGMATISM SCALE, FORM E

TEACHER NUMBER	SCORE	PERCENTILE
1	91	98
2	103	95
3	108	92
4	111	88
5	112	85
6	114	81
7	116	78
8	119	75
9	122	71
10	123	68
11	124	64
12	124	64
13	125	62
14	129	55
15	140	52
16	141	48
17	148	45
18	149	42
19	150	37
20	150	37
21	151	32
22	153	28
23	155	25
24	157	20
25	157	20
26	163	15
27	177	12
28	182	8
29	183	5
30	201	2

The results indicate the group was cognitively flexible and open-minded as measured by the Rokeach Scale. The mean and standard deviation of the group compared favorably with other groups reported by Rokeach as shown in Table IV.

TABLE IV

RELIABILITIES, MEANS, AND STANDARD DEVIATIONS OF THE ROKEACH DOGMATISM SCALE FORM E

Group	Number of Cases	Reliability	Mean	Standard Deviation
Mich. State U. I	202	.70	187.5	26.2
N.Y. Colleges	207	.75	141.4	27.2
Mich. State U. II	153	.73	126.9	20.1
Mich. State U. II	186	.71	128.3	19.2
Purdue U.	171	.76	-	-
English Colleges I	137	.91	219.1	28.3
English Colleges II	80	.81	152.8	26.2
English Workers	60	.78	175.8	26.0
Ohio State U. I	22	.85	142.6	27.0
Ohio State U. II	28	.74	143.8	22.1
Ohio State U. III	21	.74	142.6	23.3
Ohio State U. IV	29	.68	141.5	27.8
Ohio State U. V	58	.71	141.3	28.2
			143.2	27.9
Mich. State U. IV	89	.78	-	-
V.A. Domiciliary	80	-	183.2	26.6
	24	.93	-	-
	17	.84	-	-
Maryland Industrial Education Teachers	30	-	143.00	24.6

The data collected by the research team was used in making a final selection of teachers for the pilot cluster concept programs. A teacher evaluation composite (see Appendix C) was prepared to record the data and information that was obtained for each teacher. The composities included: teacher information, interview schedules ratings, Rokeach test scores, teaching experience, educational preparation, school facilities, school administration, and supervisors comments.

Final Teacher Selection

In order to make the final selection of teachers, a panel was formed to review the data collected by the project staff. The panel consisted of the following individuals:

Samuel Geissenhainer
Supervisor
Industrial & Vocational Education
Prince Georges County

Alfred C. Roth
Supervisor
Vocational Technical Education
Washington County

Donald Wilson
Supervisor
Industrial & Technical Education
Montgomery County

Dr. Donald Maley
Principal Investigator
Cluster Concept Project
University of Maryland

Eugene F. Wood
Supervisor
Industrial & Vocational Education
Frederick County

Elwood Mason
Supervisor
Industrial & Technical Education
Montgomery County

Warren Smeltzer
Assistant Director of
Vocational Education
Maryland State Department of Education

Nevin R. Frantz
Coordinator
Cluster Concept Project
University of Maryland

Each supervisor reviewed the teacher evaluation composites for the teachers in their counties and made evaluations with respect to available school facilities and school administrative policies. The supervisors made additional comments about each teacher and then ranked each one according to their evaluation of the data and information presented on the composite. The principal investigator, project coordinator, and assistant director of vocational education in Maryland also ranked each teacher under consideration for the program.

A conference was then held with each supervisor, the principal investigator, the project coordinator and the assistant director of vocational education to resolve any differences and make the final selection of teachers. As a result of this procedure, the following teachers were selected for participation in the cluster concept program:

Frederick County	High School	Occupational Cluster
James R. Mason	Middletown	Construction
Harold J. Slimmer	Frederick	Metal Forming & Fabrication
Donald H. Campbell	Brunswick	Electro-Mechanical Installation and Repair
Montgomery County		
Charles T. Barton	Poolesville	Construction
Daniel P. Harrison	Montgomery Blair	Metal Forming & Fabrication
Prince Georges County		
John L. Burrell	Fairmont Heights	Construction
William H. Stewart	Fairmont Heights	Metal Forming & Fabrication
John J. Millett	Bladensburg	Electro-Mechanical Installation and Repair
Washington County		
Paul H. Imphong	Hancock	Construction
Truman Doyle	Boonsboro	Metal Forming & Fabrication
Morris E. Lay	South Hagerstown	Electro-Mechanical Installation and Repair

In order to summarize all the information used in the selection of the eleven teachers who would teach the pilot programs of the cluster concept project during the school year 1967-68, an individual teacher profile was developed. The profile contained information from the following criteria used in the selection process: (1) school facilities; (2) school administration; (3) education; (4) teaching experience; (5) occupational experience; (6) interview results; and (7) Rokeach Scale results. The values shown on the profile were derived in the following manner:

School Facilities -The physical facilities of each teacher's shop were rated by the industrial education supervisor as inadequate (0) to adequate (10) for conducting a pilot program of the cluster concept.

School Administration -The attitude of the administration of the school towards the cluster concept was rated by the industrial education supervisor as disinterested and uncooperative (0) to very interested and willing to cooperate (10).

Education -Values were assigned to different levels of educational preparation of each teacher as follows:
  Vocational certificate - 2
  Bachelors degree - 4
  Bachelors degree plus thirty hours - 6
  Masters degree - 8
  Masters degree plus thirty hours - 10

Teaching Experience -The number of years of teaching experience was equal to the value indicated on the profile up to a maximum of ten years.

Occupational Experience-Credit for practical experience related to the cluster with which the teacher would work was granted with the number of years experience equal to the number on the profile up to a total or maximum of ten years.

Interview Results -This was the total average rating received by the teacher on the interview schedule ratings (0-10).

Rokeach Results -This was one-tenth of the percentile score received by the teacher on the Rokeach Test.

Individual profiles for each of the eleven teachers selected for the pilot programs will be found on the following pages.

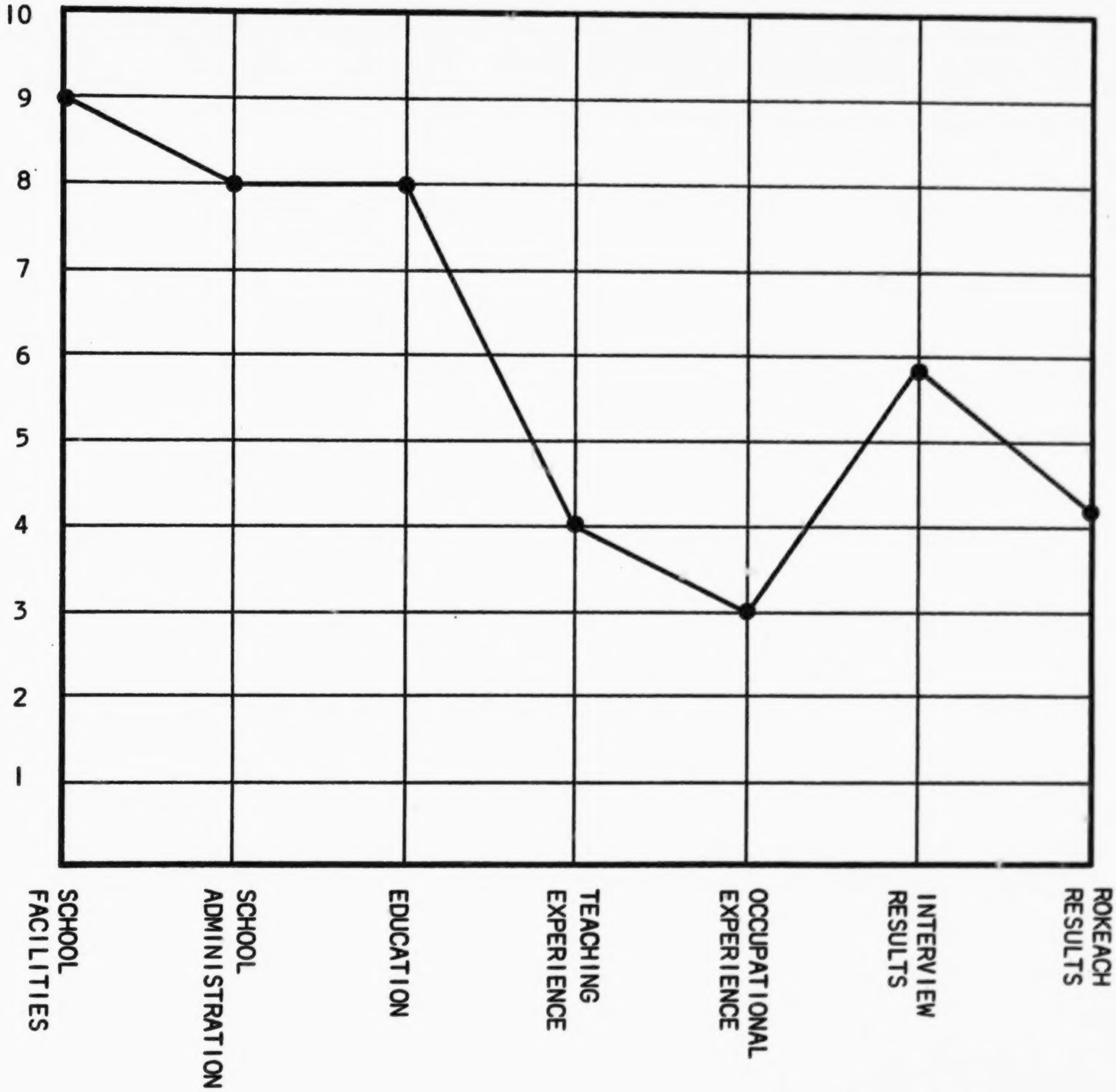

FIGURE 1.

TEACHER PROFILE FOR CHARLES BARTON

CONSTRUCTION CLUSTER - POOLESVILLE HIGH SCHOOL

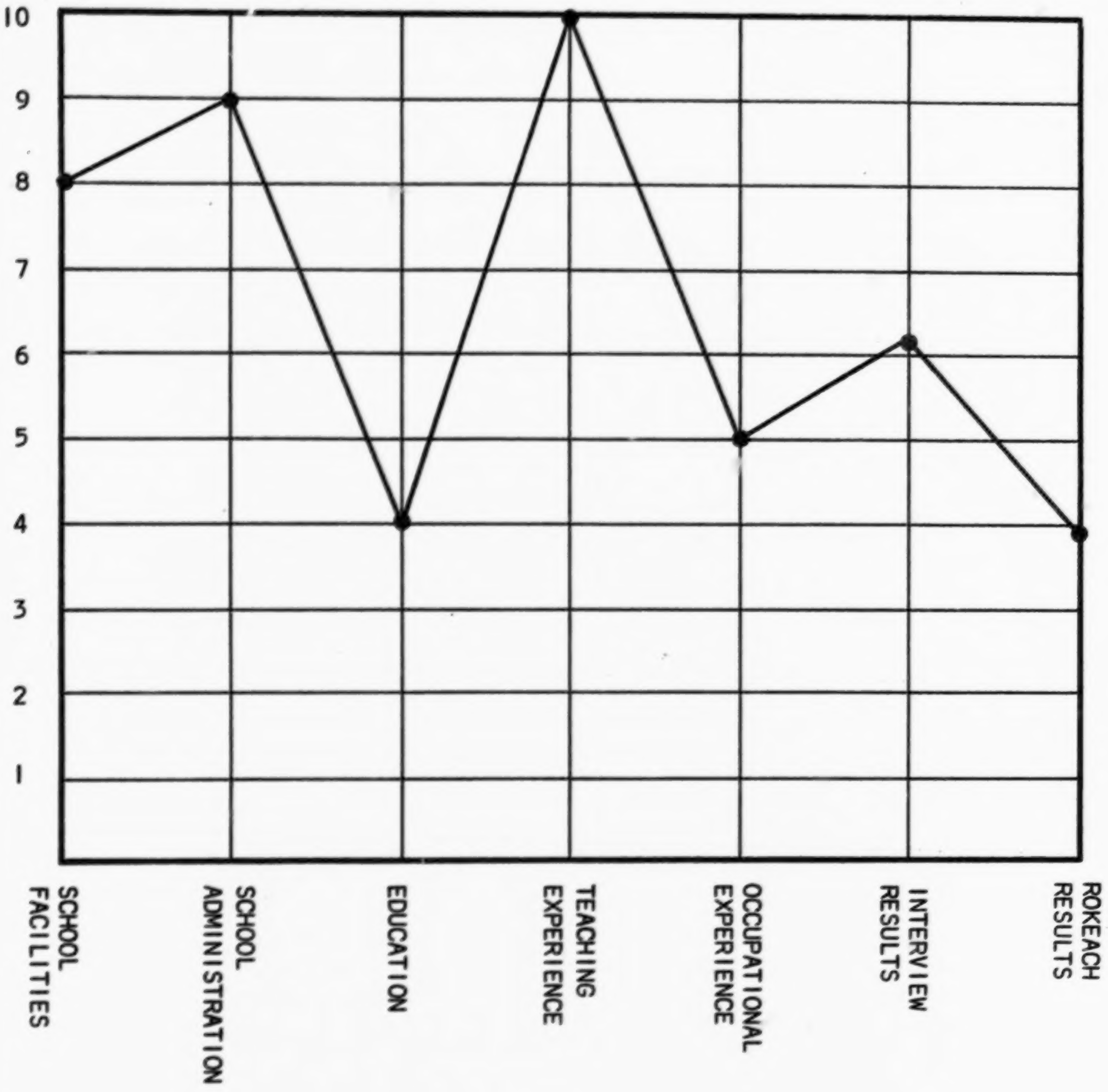

FIGURE 2.

TEACHER PROFILE FOR JOHN BURRELL

CONSTRUCTION CLUSTER - FAIRMONT HEIGHTS HIGH SCHOOL

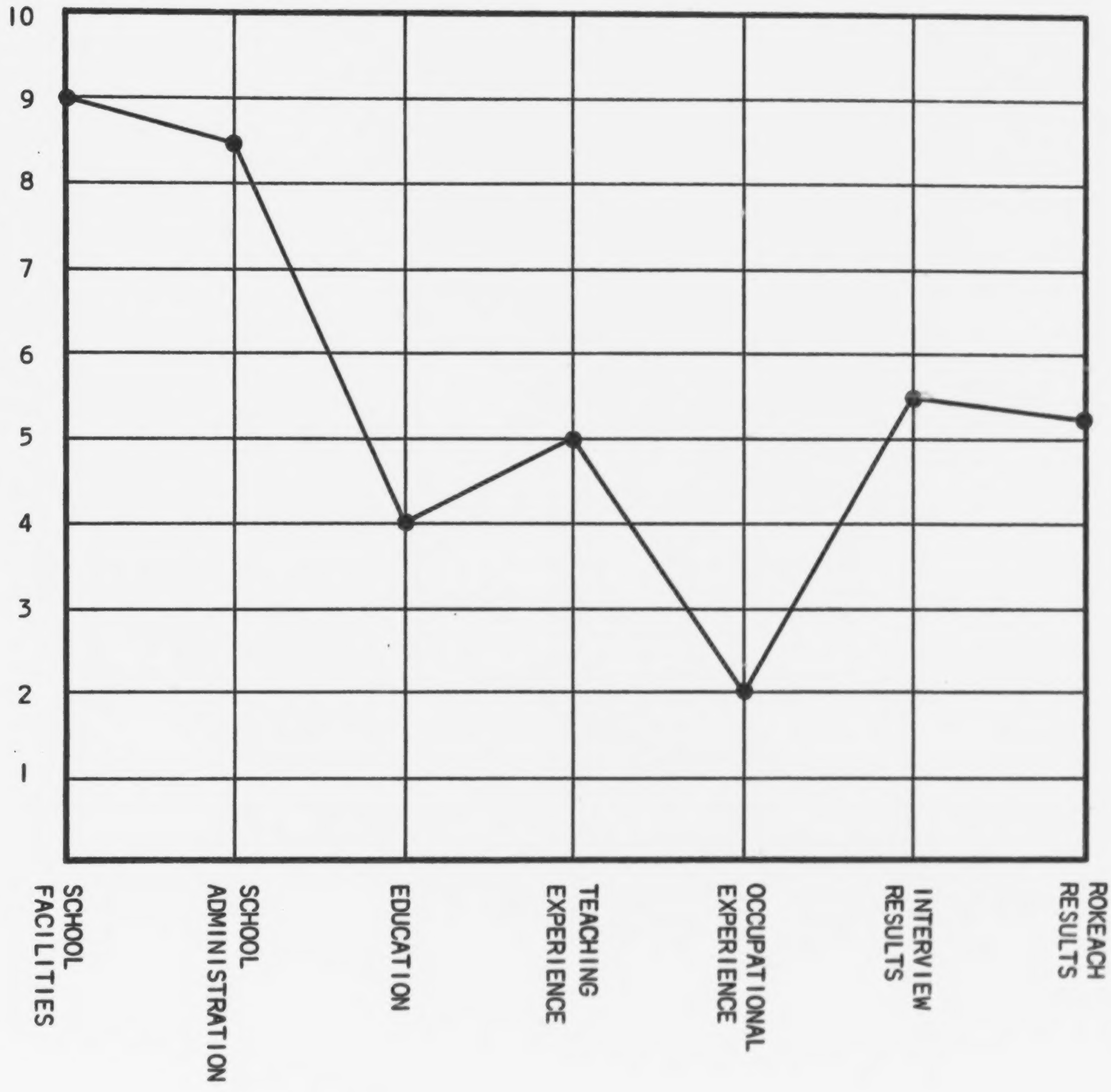

FIGURE 3.

TEACHER PROFILE FOR DONALD CAMPBELL

ELECTRO-MECHANICAL CLUSTER - BRUNSWICK HIGH SCHOOL

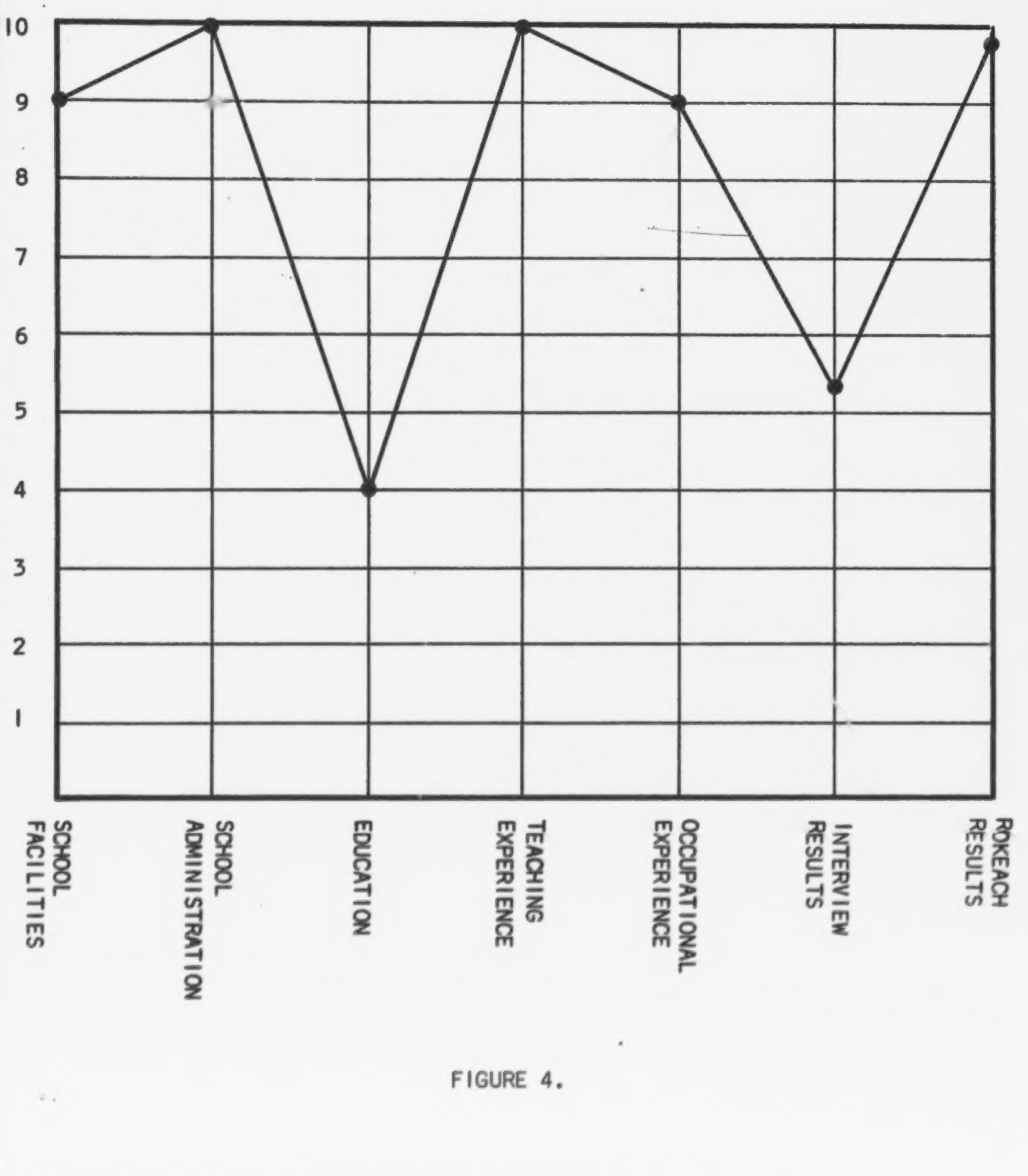

FIGURE 4.

TEACHER PROFILE FOR TRUMAN DOYLE

METAL FORMING AND FABRICATION CLUSTER - BOONSBORO HIGH SCHOOL

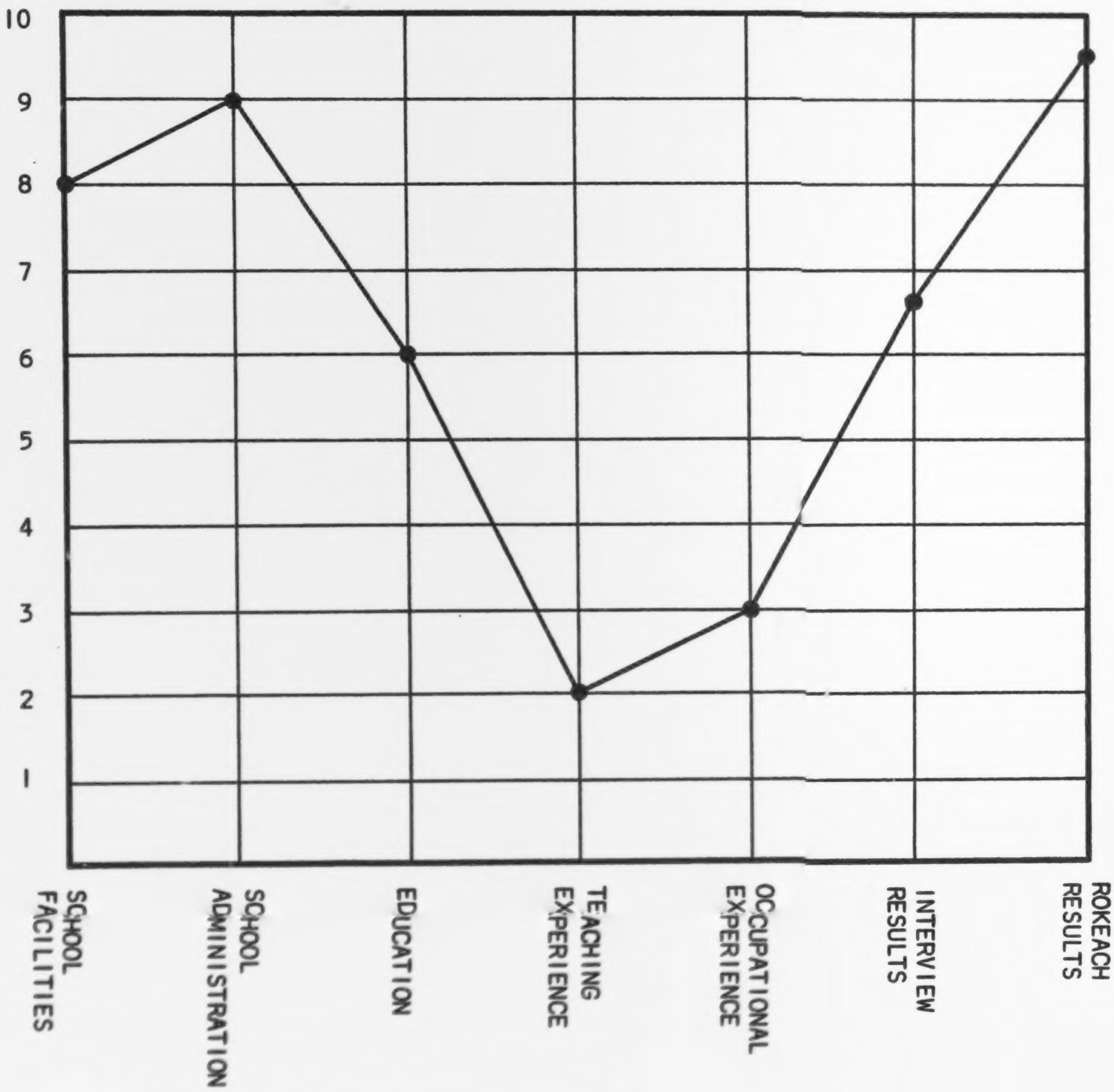

FIGURE 5.

TEACHER PROFILE FOR DANIEL HARRISON

METAL FORMING AND FABRICATION CLUSTER - MONTGOMERY BLAIR HIGH SCHOOL

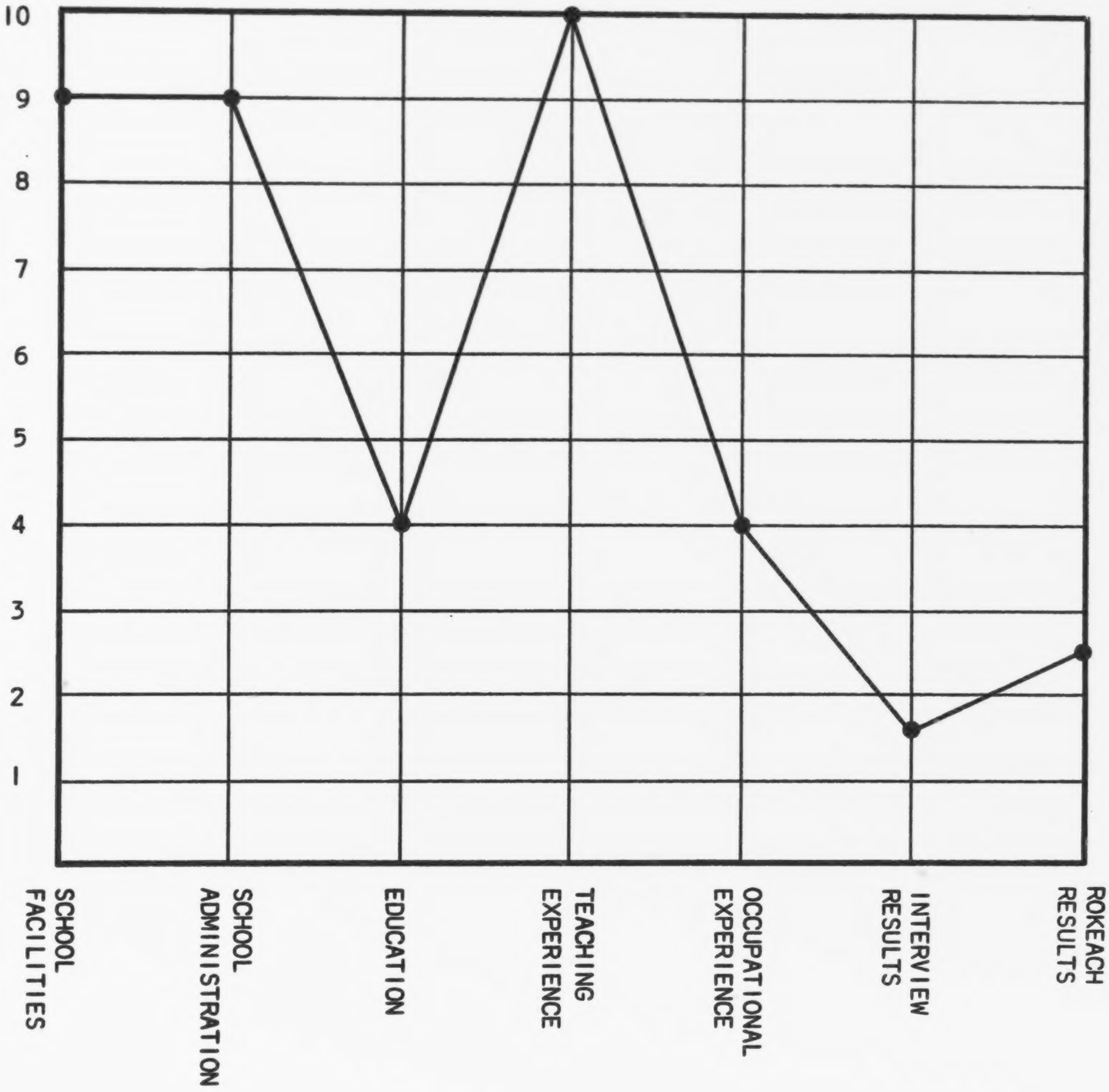

FIGURE 6.

TEACHER PROFILE FOR PAUL IMPHONG

CONSTRUCTION CLUSTER - HANCOCK HIGH SCHOOL

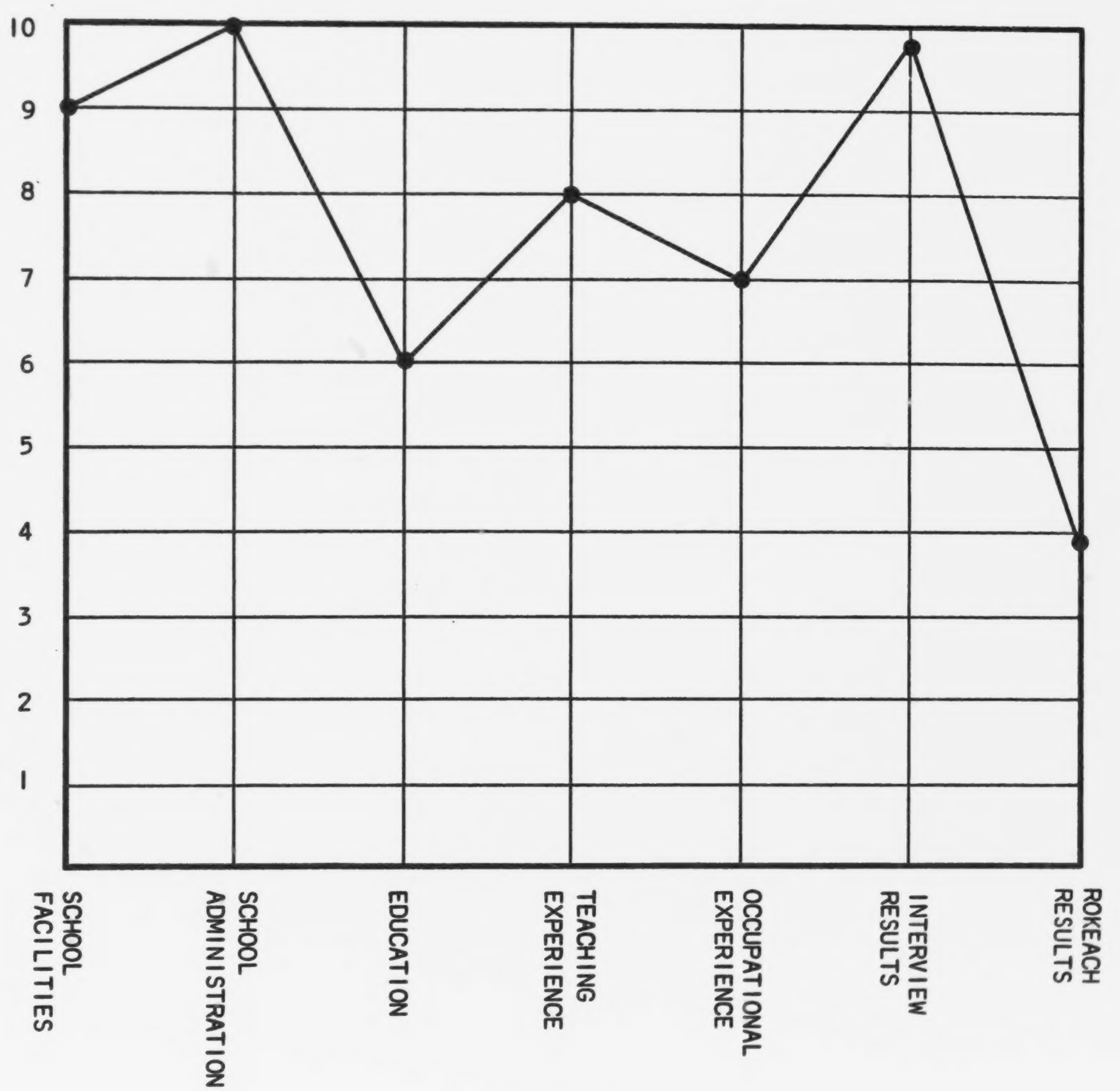

FIGURE 7.

TEACHER PROFILE FOR MORRIS LAY

ELECTRO-MECHANICAL CLUSTER - SOUTH HAGERSTOWN HIGH SCHOOL

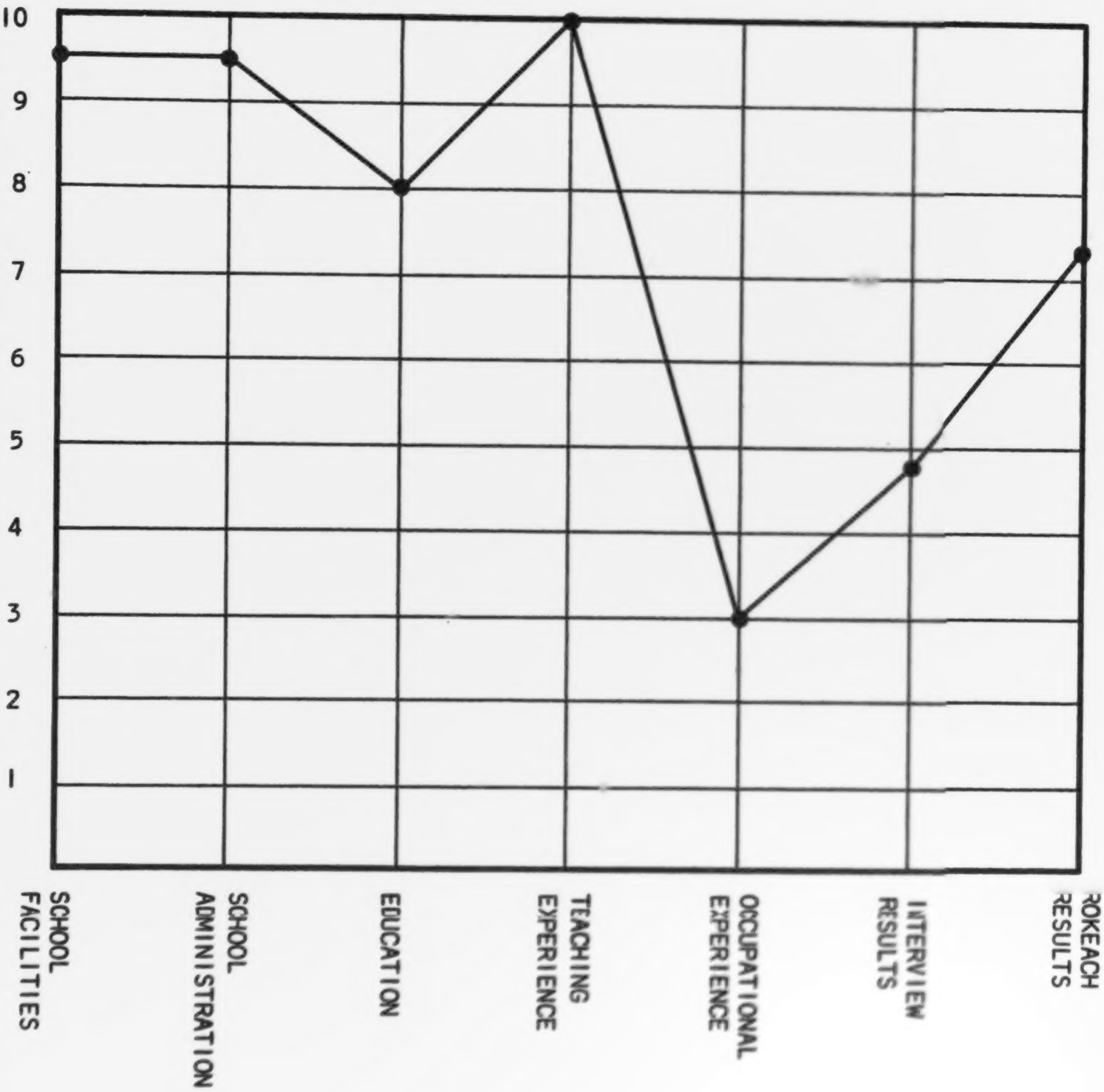

FIGURE 8.

TEACHER PROFILE FOR JAMES MASON

CONSTRUCTION CLUSTER - MIDDLETOWN HIGH SCHOOL

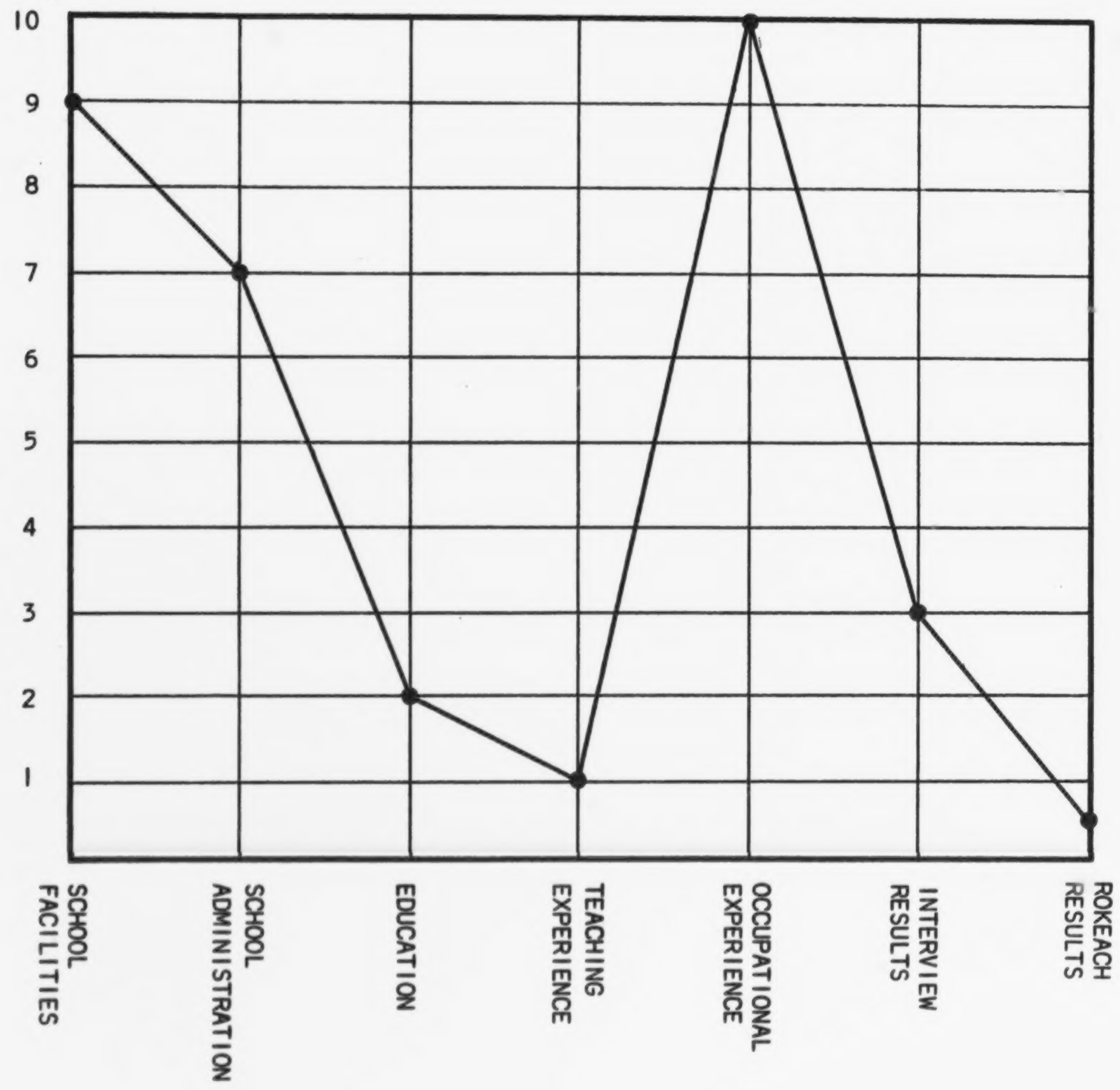

FIGURE 9.

TEACHER PROFILE FOR JOHN MILLETT

ELECTRO-MECHANICAL CLUSTER - BLADENSBURG HIGH SCHOOL

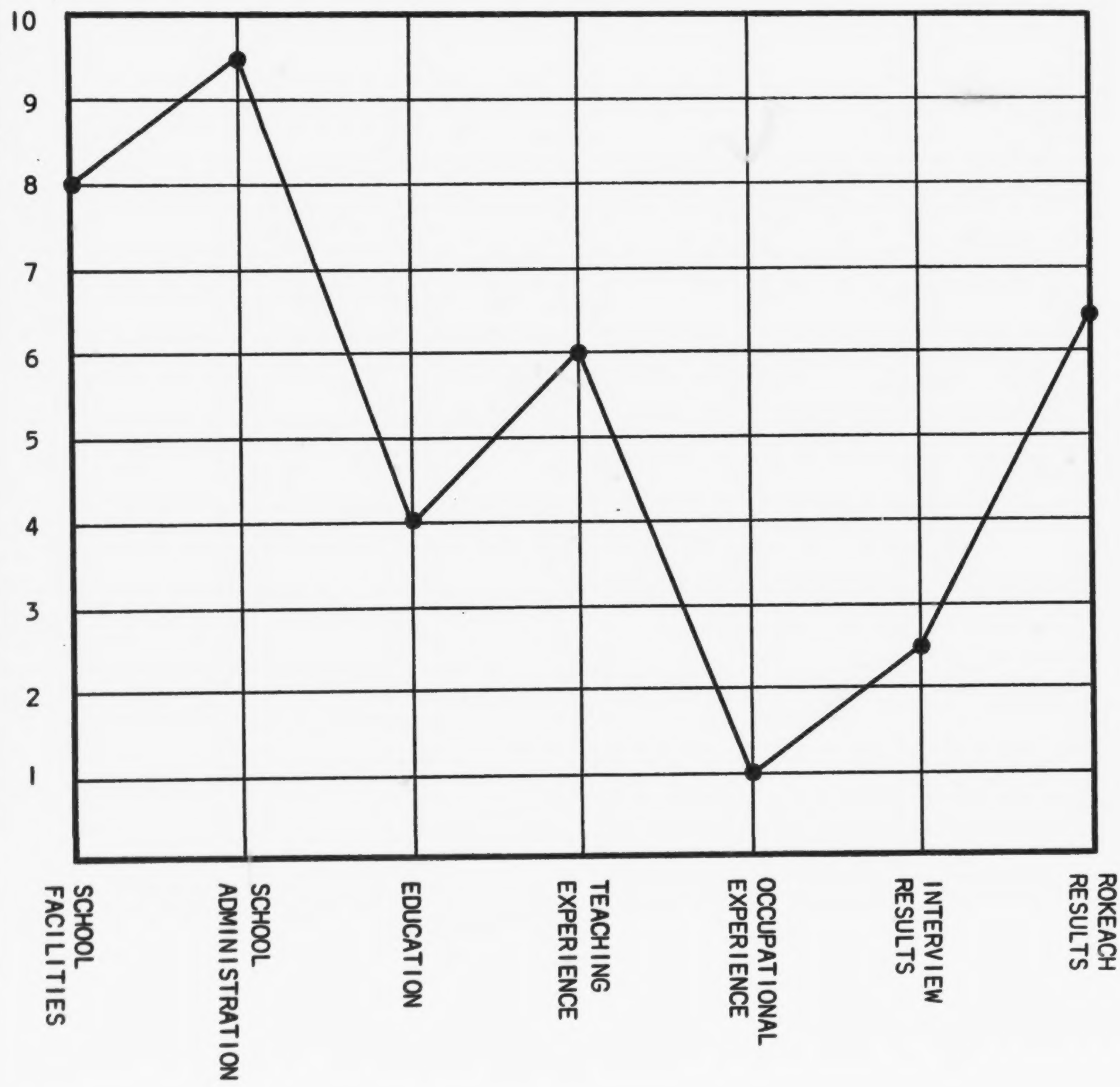

FIGURE 10.

TEACHER PROFILE FOR HAROLD SLIMMER

METAL FORMING AND FABRICATION CLUSTER - FREDERICK HIGH SCHOOL

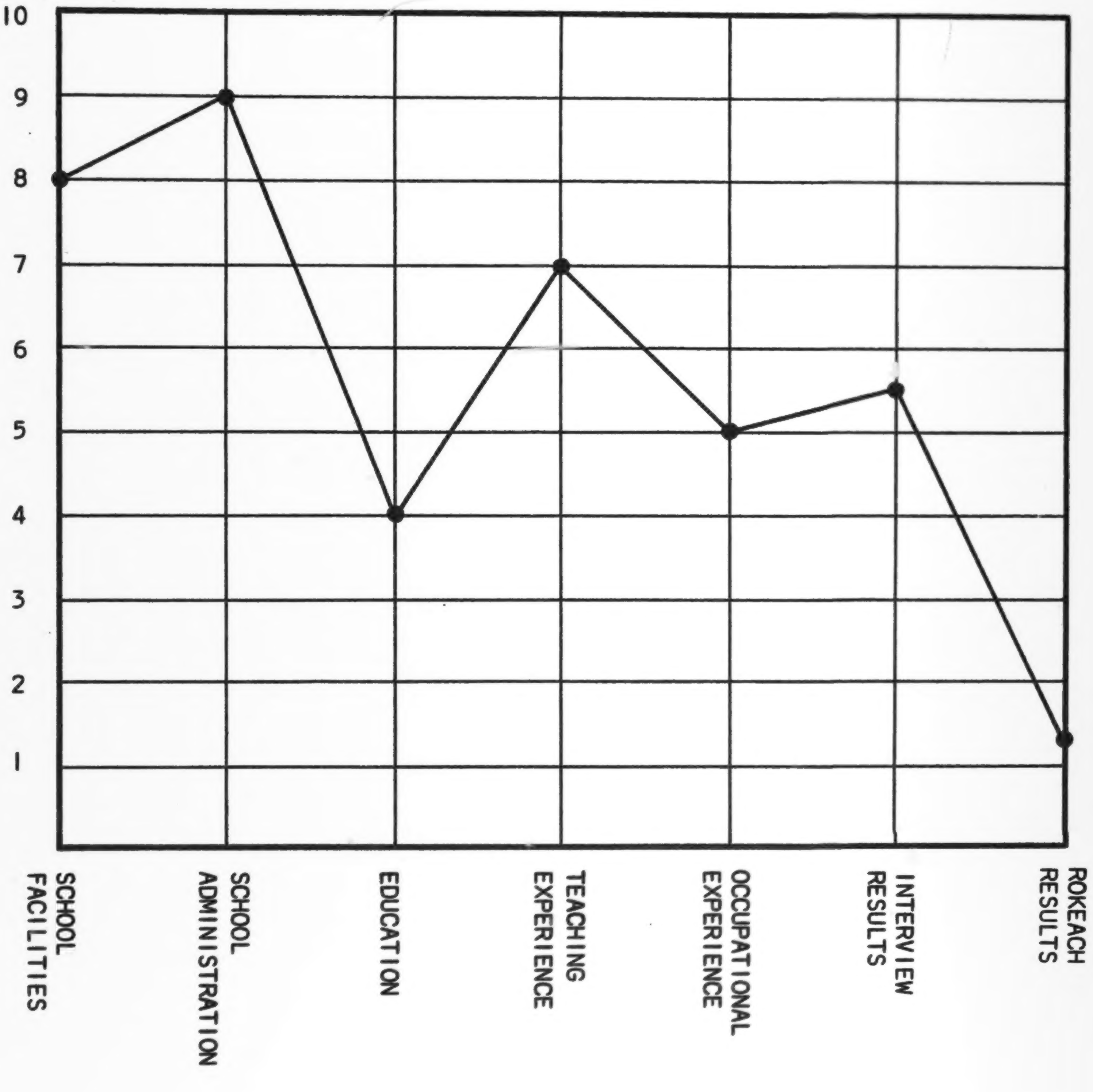

FIGURE II.

TEACHER PROFILE FOR WILLIAM STEWART

METAL FORMING AND FABRICATION CLUSTER - FAIRMONT HEIGHTS HIGH SCHOOL

PART II

THE TEACHER PREPARATION PROGRAM

Spring Semester Program

Planning the program. During the Spring semester of the 1966-67 academic year, the persons selected to staff the pilot cluster concept programs entered into a teacher preparation program. This program was organized and directed by the personnel of the research team.

The program was developed through a series of seminars involving the research staff, project coordinator, and principal investigator. Consultants from the industrial education department also provided advice at various times during the planning and organization of the program. The results of the discussions held during the seminar sessions indicated the following objectives should be attained during the Spring semester program:

1. Developing an understanding of the cluster concept as a program in vocational education at the secondary school level.
2. Developing the capability of preparing objectives in behavioral terms.
3. Developing an understanding of the research procedures utilized in formulating content for the occupational clusters of the program.
4. Applying knowledge about the types and proper use of instructional materials for a cluster concept program.

5. Applying information about a range of instructional systems and methods appropriate for use in a cluster concept program.
6. Applying knowledge about a range of evaluation methods for use in a cluster concept program.

A schedule of activities, based on the proposed objectives, was developed by the staff for sixteen three-hour weekly sessions of the Spring semester. These schedules are shown in Appendix D. Each one includes the objectives to be accomplished, the personnel involved, methods and materials to be used, the staff and student activities, and the assignments for the next session.

Activities of the program. The teachers participating in the program met one night a week for sixteen weeks. The teachers from Montgomery and Prince Georges counties met at the University of Maryland, College Park, Maryland, while the teachers from Frederick and Washington counties met at Middletown High School, Middletown, Maryland. The objectives, procedures, activities, and results of each session are presented below in an outline form.

SESSION NO. I

Objective:

To develop an understanding of the cluster concept as a program in vocational education on the secondary school level.

I. Procedures and Activities:

   A. Statement of welcome to the cluster concept teachers by Mr. Warren Smeltzer, Assistant Director of Vocational Education for the State of Maryland, and the industrial education supervisors of the four participating counties.

   B. Overview of the cluster concept program by project coordinator.

C. Visual presentation of the initial research activities by the project team.

  1. Description of research procedures.

  2. Formation of occupational clusters.

  3. Task identification and description in behavioral terms.

  4. Job entry task identification.

  5. Task analysis and description in behavioral terms.

  6. Identification of common areas of human requirement (skills, measurement, communication, science, and mathematics information) and development of the course outline.

D. Question and answer session between project staff and cluster concept teachers.

E. Analysis of a task to determine the areas of human requirement needed for job entry performance by the cluster concept teachers.

F. Selection by cluster concept teachers of a task to analyze within the assigned occupation of the cluster.

G. Selection of the information and other materials that would be helpful in analyzing the chosen task.

H. Advising and assisting cluster concept teachers by project team in analyzing a task according to areas of human requirement.

II. Results and Observations:

A. Question and answer session removed the difficulty the cluster concept teachers had in understanding the initial activities of the project team as depicted by the visual presentation.

B. Project teams' assistance eliminated most of the difficulty experienced by the cluster concept teachers in analyzing a task to determine the areas of human requirement needed for job entry performance.

C. With assistance from the project team the cluster concept teachers satisfactorily analyzed a task and identified areas of human requirement necessary to teach the task.

SESSION NO. 2

Objective:

To develop within the student the ability to write statements in behavioral terms.

I. Procedures and Activities:

A. Presentation of filmstrip by project team ("Writing Behavioral Objectives").

B. Recording of filmstrip responses by the cluster concept teachers on the response sheets provided by the project team.

C. Review of response sheets and group discussion led by the project team.

D. Visual presentation by the project team explaining how behavioral statements were developed and utilized in the research procedures.

E. In connection with the assignment from session no. 1, cluster concept teachers' presentation and discussion of areas of human requirement for the selected task in the occupational cluster.

F. Comparison of cluster concept teachers' list of areas of human requirement with list developed by project team.

G. With the aid of the project team:

1. Cluster concept teachers began writing areas of human requirement in behavioral terms.

2. Cluster concept teachers suggested possible factors necessary for teacher to present task content to students.

II. Results and Observations:

A. The review of response sheets and group discussion greatly facilitated cluster concept teachers' understanding of behavioral terms and statements and the advantage in using them.

B. Cluster concept teachers' list of areas of human requirement compared favorably with the project team's list.

C. Cluster concept teachers wrote areas of human requirement in behavioral terms to the satisfaction of the project team.

D. Cluster concept teachers developed an extensive list of items needed to successfully present task content to students.

SESSION NO. 3

Objective:

To develop a tentative format for the instructional plan to be utilized by cluster concept teachers in teaching the tasks in the occupational clusters.

I. Procedures and Activities:

A. Preparation of visual overlays of suggested format for instructional plan by cluster concept teachers.

B. Presentation of visual overlays developed by cluster concept teachers.

C. Review of overlay presentation and group discussion led by project team.

D. Acceptance of tentative format for instructional plan by cluster concept teachers and project team.

E. Analysis of selected task according to accepted tentative format for instructional plan.

F. Familiarization of cluster concept teachers with supplementary instructional materials by project team.

II. Results and Observations:

A. Overlay presentations indicated most cluster concept teachers had difficulty in developing format for instructional plans.

B. Review of presentation and group discussion, led by project team, overcame cluster concept teachers' difficulties with format for instructional plans.

C. Cluster concept teachers satisfactorily analyzed a selected task according to accepted tentative format for instructional plan.

D. Familiarization of cluster concept teachers with supplementary instructional materials resulted in a broadening of original instructional plans by cluster concept teachers.

SESSION NO. 4 - 14

Objectives:

1. To develop instructional plans for teaching occupational clusters (according to final format shown in Figure 12).

2. To become familiar with instructional systems and techniques available for use in implementing the cluster concept programs.

I. Procedures and Activities:

A. Familiarization of cluster concept teachers with available instructional material.

B. Review and evaluation of instructional material by cluster concept teachers.

C. Development of instructional plans by cluster concept teachers:

1. Arrangement of areas of human requirement in instructional sequence.

2. Identification of appropriate teaching methods for each area of human requirement.

3. Identification of suitable instructional materials.

4. Description of student activities.

5. Identification of appropriate evaluation techniques.

D. Review and discussion of instructional plans developed by cluster concept teachers.

E. Revision and finalization of instructional plans developed by cluster concept teachers.

F. Presentation by audio-visual representatives:

1. Electronic Futures Industry (audio-tape systems)

2. The Welch Scientific Company (autotutor)

3. 3M Company (overhead projector and accessories)

TASK I: TURNING STOCK ON LATHE TO PRODUCE A FACED SURFACE

Area of Human Requirement	Suggested Teaching Methods	Suggested Instructional Materials	Suggested Student Activities	Suggested Evaluation Procedures
Reading a blueprint to determine the: a. Kind of material b. Size of work c. Characteristics of work d. Number of parts to be machined e. Kind of material	Demonstration: Video-tape recorders. Film.	Tools: Scale Materials: Blueprints Blueprint Reading for Beginners In Machine Shop Practice, Delmar Publishers, Inc., pp. 1-4. Film: "The Metal Worker," 29 min., free, B. & W, Modern Talking Picture Service.	Class: Reading blueprints while teacher explains. Viewing a film. Assignment: Reading unit #3, Metalwork Technology and Practice, Ludwig, pp. 27-33.	Observing students in selecting material and laying out stock. Paper and pencil test on items in film. Checking answer booklet to programmed test.
Explaining the physical properties of the machinability of various metals. Explaining gear and pulley drive ratios. Explaining heat transfer as it relates to coolants.	Video-tape recorders. Lecture.	Tools: Lathe Materials: Engine Lathe Operations, Whipple and Baudek, Unit 28, pp. 44-48. Lathe Work, Delmar Publishers, Inc., Engine Lathe Operations, Whippel and Baudek, Unit 27, pp. 43-45.	Class: Listening to teacher's explanation on machinability of various metals, gear and pulley drive ratios and heat transfer as it relates to coolants. Assignment: Reading unit 82, General Introduction to Machine Shop, Johnson, pp. 337-339. Reading Chapter II, Machine Tool Operator Part I, Burghardt, pp. 36-49.	Checking students on assignments.
Measuring stock with a rule scale to determine length.	Demonstration	Tools: Rule or Scale Materials: Stock to be measured.	Class: Measuring stock with a rule or scale to determine length. Assignment: Reading unit 6, General Introduction to Machine Shop, Johnson, pp. 70-73.	Observing students in measuring stock with a scale or rule to determine length.
Comparing fractional equivalents of decimals. Computing automatic feed for various metals. Computing cutting speeds for various metals. Applying knowledge of fractional parts of an inch. Applying knowledge of decimals.	Lecture	Tools: Chalk and chalkboard Materials: Shop Arithmetic Delmar Publishers, Inc., Albany 1, New York.	Class: Computing fractional equivalents of decimals, automatic feed and cutting speeds for various metals. Applying knowledge of fractional parts of an inch and applying knowledge of decimals. Assignment: Shop Arithmetic, Delmar Publishers, Inc., unit 11, pp. 24-25.	Checking students with a written test.

FIGURE 12. INSTRUCTIONAL PLAN FORMAT

4. Perceptual Development Laboratories (perceptoScope and accessories)

5. Professional Products, Inc. (video-tape systems)
Kunz, Inc.

G. Presentations of audio-visual apparatus and techniques by project team:

1. Closed loop movie projector

2. Tape recorders

3. Filmstrip and movie projectors

4. Slide projectors

II. Results and Observations:

A. Familiarization of cluster concept teachers with available instructional materials and review and evaluation of material facilitated development of final instructional plans.

B. Review and discussion of cluster concept teacher-prepared instructional plans facilitated the standardization of instructional plans within clusters.

C. Audio-visual presentations by industrial representatives and project team resulted in cluster concept teachers being able to incorporate specific application of audio-visual apparatus and techniques into final instructional plans.

SESSION NO. 15

Objectives:

1. To arrange the tasks in each occupational cluster in a teaching sequence.

2. To develop group project ideas.

3. To develop ideas for instructional materials to be prepared during Summer session.

4. To provide teachers with the Teacher Experience Inventory (see Appendix G) in order to obtain areas of occupational weakness and strength.

I. Procedures and Activities:

A. Presentation of tasks in assigned occupation in a teaching sequence by cluster concept teachers.

B. Discussion of cluster task sequencing possibilities.

C. Cluster concept teachers' presentation of unifying project ideas incorporating tasks in assigned occupation.

D. Discussion of possible cluster unifying projects.

E. Group discussion of instructional material applicable to teaching the cluster concept.

F. Presentation of task experience inventory to cluster concept teachers by project team.

II. Results and Observations:

A. With project team's assistance, cluster concept teachers developed cluster sequence of tasks.

B. Cluster concept teachers developed list of possible unifying projects.

C. Cluster concept teachers developed a tentative list of instructional materials, noting specific application for teaching cluster concept.

D. Cluster concept teachers read through Teacher Experience Inventory to be completed and returned next session.

SESSION NO. 16

Objectives:

1. To finish and review list of instructional materials to be prepared during Summer workshop.

2. To become orientated to the Summer workshop activities.

3. To return completed Teacher Experience Inventory indicating those tasks in the assigned cluster in which additional experience is needed.

I. Procedures and Activities:

   A. Cluster concept teachers review and discuss tentative list of instructional materials with project team.

   B. Cluster concept teachers make suggested revisions and firm-up list of instructional materials.

   C. Project team present discussion of Summer workshop program.

   D. Question and answer session.

   E. Presentation of completed Task Experience Inventories by cluster concept teachers.

II. Results and Observations:

   A. Cluster conept teachers finalize list of applicable instructional materials.

   B. Handout developed by project team provided adequate information about Summer program.

   C. Handout sheets and question and answer session provided cluster concept teachers with an understanding of the Summer workshop program.

   D. Cluster concept teachers returned completed Task Experience Inventories to project team. The tasks in which the cluster concept teachers indicated they had limited or inadequate occupational experience appear on the following pages.

LIMITED EXPERIENCE TASKS

FOR MORRIS LAY

Electro-Mechanical Installation and Repair Cluster

Business Machine Servicing

Disassembling the typewriter for cleaning.

Cleaning typewriter to remove dirt.

Removing the defective part (s) of the typewriter.

Disassembling the adding machine for cleaning.

Testing the operation of the repaired adding machine.

Air Conditioning & Refrigeration Servicing

Removing the cover from the unit for ease of servicing.

Replacing the cover on the unit to restore to the original condition.

Radio and Television Servicing

Removing the chassis from the cabinet for ease of servicing.

Replacing the chassis in the cabinet after a final inspection of the radio.

Home Appliance Servicing

Observing the symptoms to determine the defect (s) in small heating element appliances.

Isolating the defect to a particular section of the heating element appliance.

Isolating the defect to a particular component of the heating element appliance.

Testing the operations of the repaired small heating element appliance.

Observing the symptoms to determine the defect (s) in small motor driven appliances.

Disassembling small electric motor appliances for testing and repairing.

Isolating the mechanical defects to a particular section of the small electric motor appliances.

Isolating the electrical defect (s) to a particular section of the small electric motor appliances.

Isolating the defect to a particular component of the small electric motor appliance.

Replacing the defective part (s) of the small electric motor appliances.

Testing the installation of the automatic dryer and making any final adjustments necessary.

Explaining the operation of the automatic dryer to the customer.

Disassembling the automatic electric dryer in order to make the necessary repair (s).

Replacing the defective part (s) of the automatic electric dryer.

Making any final adjustments to the repaired automatic electric dryer.

Disassembling the refrigerator in order to make the necessary repair (s).

Replacing the defective part (s) of the refrigerator.

Disassembling the electric range in order to make the necessary repair (s).

Replacing the defective part (s) of the electric range.

Reassembling the repaired electric range.

Making any final adjustments to the repaired electric range.

INADEQUATE EXPERIENCE TASKS

FOR MORRIS LAY

Electro-Mechanical Installation and Repair Cluster

Air Conditioning & Refrigeration Servicing

Testing lines with detection device for leaks.

Evacuating the entire system with a vacuum pump to remove all non-condensibles.

Radio and Television Servicing

Observing the symptoms to determine the defective stage of the radio.

Checking the tubes in the suspected defective stage of the radio.

Replacing the defective components in a particular stage of the radio.

Making final operational checks and adjustment to the radio.

Observing the symptoms to determine the defective stage of the television set.

Checking the tubes in the suspected stage.

Removing the chassis from the cabinet for ease of servicing.

Replacing the defective components in a particular stage of the television set.

Replacing the chassis in the cabinet after a final inspection of the television set.

Making final operational checks and adjustment to the television set.

Home Appliance Servicing

Observing the symptoms to determine the defect (s) in an automatic washer.

Disassembling the automatic washer in order to make the necessary repair (s).

Replacing the defective part (s) of the automatic washer.

INADEQUATE EXPERIENCE TASKS

FOR DONALD CAMPBELL

Electro-Mechanical Installation and Repair Cluster

Air Conditioning & Refrigeration Servicing

Testing lines with detection device for leaks.

LIMITED EXPERIENCE TASKS

FOR DONALD CAMPBELL

Electro-Mechanical Installation and Repair Cluster

Business Machine Servicing

Disassembling the typewriter for cleaning.

Cleaning typewriter to remove dirt.

Removing the defective part (s) of the typewriter.

Disassembling the adding machine for cleaning.

Air Conditioning & Refrigeration Servicing

Evacuating the entire system with a vacuum pump to remove all non-condensibles.

Removing the cover from the unit for ease of servicing.

Replacing the cover on the unit to restore to the original condition.

Radio and Television Servicing

Observing the symptoms to determine the defective stage of the radio.

Making final operational checks and adjustment to the radio.

Making final operational checks and adjustment to the television set.

Home Appliance Servicing

Observing the symptoms to determine the defect (s) in small heating element appliances.

Disassembling small heating element appliances for testing and repairing.

Isolating the defect to a particular section of the heating element appliance.

Replacing the defective part (s) of small heating element appliances.

Testing the operations of the repaired small heating element appliances.

Reassembling the repaired small heating element appliance.

Retesting the assembled small heating element appliance.

Observing the symptoms to determine the defect (s) in small motor driven appliances.

Isolating the mechanical defects to a particular section of the small electric motor appliances.

Isolating the electrical defect (s) to a particular section of the small electric motor appliances.

Isolating the defect to a particular component of the small electric motor appliance.

Checking the installation of the electric range and making any final adjustments necessary.

Explaining the operation of the electric range to the customer.

Testing the installation of the automatic dryer and making any final adjustments necessary.

Explaining the operation of the automatic dryer to the customer.

Checking the installation of the automatic washer and making any final adjustments necessary.

Explaining the operation of the automatic washer to the customer.

Checking the installation of the refrigerator and making any final adjustments necessary.

Explaining the operation of the refrigerator to the customer.

Observing the symptoms to determine the defect (s) in an automatic washer.

Disassembling the automatic washer in order to make the necessary repair (s).

Replacing the defective part (s) of the automatic washer.

Retesting the assembled automatic washer.

Disassembling the automatic electric dryer in order to make the necessary repair (s).

Replacing the defective part (s) of the automatic electric dryer.

Making any final adjustments to the repaired automatic electric dryer.

Retesting the assembled automatic electric dryer.

Disassembling the refrigerator in order to make the necessary repair (s).

Replacing the defective part (s) of the refrigerator.

Testing the operation of the refrigerator.

Making any final adjustments to the repaired refrigerator.

Retesting the assembled refrigerator.

Disassembling the electric range in order to make the necessary repair (s).

Replacing the defective part (s) of the electric range.

Reassembling the repaired electric range.

Testing the operation of the electric range.

Making any final adjustments to the repaired electric range.

Retesting the assembled electric range.

2

INADEQUATE EXPERIENCE TASKS

FOR JOHN MILLETT

Electro-Mechanical Installation and Repair Cluster

Business Machine Servicing

Disassembling the typewriter for cleaning.

Cleaning typewriter to remove dirt.

Removing the defective part (s) of the typewriter.

Disassembling the adding machine for cleaning.

Testing the operation of the repaired adding machine.

Air Conditioning & Refrigeration Servicing

Testing lines with detection device for leaks.

Evacuating the entire system with vacuum pump to remove all non-condensibles.

Removing the cover from the unit for ease of servicing.

Replacing the cover on the unit to restore to the original condition.

Radio and Television Servicing

Observing the symptoms to determine the defective stage of the radio.

Checking the tubes in the suspected defective stage of the radio.

Replacing the defective components in a particular stage of the radio.

Removing the chassis from the cabinet for ease of servicing.

Replacing the chassis in the cabinet after a final inspection of the television set.

Replacing the chassis in the cabinet after a final inspection of the radio.

Making final operational checks and adjustment to the radio.

Observing the symptoms to determine the defective stage of the television set.

Checking the tubes in the suspected stage.

Replacing the defective components in a particular stage of the television set.

Making final operational checks and adjustment to the television.

Home Appliance Servicing

Observing the symptoms to determine the defect (s) in small heating element appliances.

Disassembling small heating element appliances for testing and repairing.

Isolating the defect to a particular section of the heating element appliance.

Isolating the defect to a particular component of the heating element appliance.

Replacing the defective part (s) of small heating element appliance.

Testing the operations of the repaired small heating element appliance.

Reassembling the repaired small heating element appliance.

Retesting the assembled small heating element appliance.

Observing the symptoms to determine the defect (s) in small motor driven appliances.

Isolating the mechanical defects to a particular section of the small electric motor appliances.

Disassembling small electric motor appliances for testing and repairing.

Isolating the electrical defect (s) to a particular section of the small electric motor appliances.

Isolating the electrical defect (s) to a particular component of the small electric motor appliances.

Replacing the defective part (s) of the small electric motor appliances.

Testing the operation of the repaired small electric motor appliances.

Reassembling the repaired small electric motor appliances.

Retesting the repaired small electric motor appliances.

Connecting the electrical supply to the electric range in the home.

Checking the installation of the electric range and making any final adjustments necessary.

Explaining the operation of the electric range to the customer.

Installing the vent system for the automatic dryer in the home.

Connecting the electrical supply to the automatic dryer in the home.

Testing the installation of the automatic dryer and making any final adjustments necessary.

Explaining the operation of the automatic dryer to the customer.

Connecting the water supply to the automatic washer in the home.

Connecting the electrical supply to the automatic washer in the home.

Checking the installation of the automatic washer and making any final adjustments necessary.

Explaining the operation of the automatic washer to the customer.

Connecting the electrical supply to the refrigerator in the home.

Checking the installation of the refrigerator and making any final adjustments necessary.

Explaining the operation of the refrigerator to the customer.

Observing the symptoms to determine the defect (s) in an automatic washer.

Disassembling the automatic washer in order to make the necessary repair (s).

Replacing the defective part (s) of the automatic washer.

Retesting the assembled automatic washer.

Disassembling the automatic electric dryer in order to make the necessary repair (s).

Testing the operation of the automatic electric dryer.

Making any final adjustments to the repaired automatic electric dryer.

Retesting the assembled automatic electric dryer.

Disassembling the refrigerator in order to make the necessary repair (s).

Replacing the defective part (s) of the refrigerator.

Testing the operation of the refrigerator.

Making any final adjustments to the repaired refrigerator.

Retesting the assembled refrigerator.

Disassembling the electric range in order to make the necessary repair (s).

Replacing the defective part (s) of the electric range.

Testing the operation of the electric range.

Making any final adjustments to the repaired electric range.

Retesting the assembled electric range.

Reassembling the repaired electric range.

INADEQUATE EXPERIENCE TASKS

FOR JAMES MASON

Construction Cluster

Plumbing

Insulating heating and water lines in a house.

Installing duct work for warm air heating system in a house.

Electricity

Installing rigid, thin wall and flexible conduit in a house.

Masonry

Shoring sidewalls of earthen ditches to prevent cave-ins during excavation.

LIMITED EXPERIENCE TASKS

FOR JAMES MASON

Construction Cluster

Plumbing

Preparing cast iron soil pipe to pour a lead joint for a waste line in a house.

Preparing lead for pouring soil pipe joints for a house.

Attaching mounting brackets for plumbing fixtures to masonry construction.

Assembling a furnace for a house.

Welding angle iron for pipe hangers.

Electricity

Installing boxes for receptacles, switches, junctions and fixtures in a house.

Installing wiring from box to box in a house.

Masonry

Cleaning and oiling concrete forms prior to and after use on a building.

Protecting a concrete slab following finishing operations to provide for proper curing.

Cleaning out mortar joints for tuck pointing on a masonry wall.

Pointing up a section of a brick wall to provide a finished appearance on a house.

Applying colorless coating to waterproof masonry surfaces above grade on a building.

Carpentry

Applying lap, plywood,or composition sheathing for a house.

Installing fire stops along plate in a house.

Building a foot rest for shingling a roof on a house.

Installing blanket, bulk, batt, rigid and metallic insulation in a house.

Painting

Preparing a surface for application of stain on the interior or exterior of a house.

Preparing joints and nail holes in dry wall construction to receive final finish.

INADEQUATE EXPERIENCE TASKS

FOR PAUL IMPHONG

Construction Cluster

Painting

Preparing joints and nail holes in dry wall construction to receive final finish.

LIMITED EXPERIENCE TASKS

FOR PAUL IMPHONG

Construction Cluster

Plumbing

Assembling a furnace for a house.

Installing duct work for warm air heating system in a house.

Electricity

Installing rigid, thin wall and flexible conduit in a house.

Masonry

Cleaning and oiling concrete forms prior to and after use on a building.

Shoring sidewalls of earthen ditches to prevent cave-in during excavation.

Wiring and bolting forms to prevent spreading during pouring.

Erecting scaffolding for use by a mason at the building site.

Cleaning out mortar joints for tuck pointing on a masonry wall.

Pointing up a section of a brick wall to provide a finished appearance on a house.

Carpentry

Erecting girders and columns for a house.

Installing hangers and anchors for floor joists for a house.

installing solid bridging between floor joists for a house.

Laying roof decking for a house.

Applying commercial wall board to the interior of a house.

INADEQUATE EXPERIENCE TASKS

FOR CHARLES BARTON

Construction Cluster

Plumbing

Preparing copper tubing for installation in a plumbing system for a house.

Welding angle iron for pipe hangers.

Insulating heating and water lines in a house.

Assembling a furnace for a house.

Installing duct work for warm air heating system in a house.

Preparing cast iron soil pipe to pour a lead joint for a waste line in a house.

Preparing lead for pouring soil pipe joints for a house.

Electricity

Installing rigid, thin wall and flexible conduit in a house.

Carpentry

Laying roof decking for a house.

Painting

Applying finishing materials to provide protection and decoration of surfaces in or on a house.

LIMITED EXPERIENCE TASKS

FOR CHARLES BARTON

Construction Cluster

Plumbing

Preparing pipe for installation in a plumbing or gas supply system in a house.

Attaching mounting brackets for plumbing fixtures to frame construction.

Electricity

Installing boxes for receptacles, switches, junctions and fixtures in a house.

Installing wiring from box to box in a house.

Connecting receptacles, single throw switches, fixtures and pilot lights to complete circuits in a house.

Masonry

Shoring sidewalls of earthen ditches to prevent cave-ins during excavation.

Wiring and bolting forms to prevent spreading during pouring.

Installing anchor bolts in masonry walls and concrete to provide a place for securing future construction.

Protecting a concrete slab following finishing operations to provide for proper curing.

Cleaning out mortar joints for tuck pointing on a masonry wall.

Pointing up a section of a brick wall to provide a finished appearance on a house.

Carpentry

Installing backing to an interior wall of a house.

Applying commercial wall board to the interior of a house.

Painting

Preparing a surface for application of stain on the interior or exterior of a house.

Preparing stain and applicator for use on the interior and exterior of a house.

Preparing clear finishes and applicators for use on the exterior and interior of a house.

Glazing a window in preparation for painting.

INADEQUATE EXPERIENCE TASKS

FOR JOHN BURRELL

Construction Cluster

Plumbing

Welding angle iron for pipe hangers.

Preparing cast iron soil pipe to pour a lead joint for a waste line in a house.

Preparing lead for pouring soil pipe joints for a house.

Assembling a furnace for a house.

LIMITED EXPERIENCE TASKS

FOR JOHN BURRELL

Construction Cluster

Plumbing

Preparing copper tubing for installation in a plumbing system for a house.

Preparing pipe for installation in a plumbing or gas supply system in a house.

Attaching mounting brackets for plumbing fixtures to frame construction.

Insulating heating and water lines in a house.

Electricity

Installing boxes for receptacles, switches, junctions and fixtures in a house.

Installing wiring from box to box in a house.

Connecting receptacles, single throw switches, fixtures and pilot lights to complete circuits in a house.

Installing rigid, thin wall and flexible conduit in a house.

Carpentry

Erecting girders and columns for a house.

Installing solid bridging between floor joists for a house.

Laying subfloors on floor joists for a house.

Applying lap, plywood or composition sheathing for a house.

INADEQUATE EXPERIENCE TASKS

FOR JACK SLIMMER

Metal Forming and Fabrication Cluster

Assembly

Adhering parts with adhesives using hand processes to produce a metal bonded assembly.

Adhering parts with adhesives using spray equipment to a specified thickness to produce a metal bonded assembly.

LIMITED EXPERIENCE TASKS

FOR JACK SLIMMER

Metal Forming and Fabrication Cluster

Machining

Grinding drill bits on a bench grinder to sharpen tools.

Welding

Gas welding ferrous metal stock to produce a vertical lap joint.

Brazing ferrous metals to produce a vertical lap joint.

LIMITED EXPERIENCE TASKS

FOR PORTER HARRISON

Metal Forming and Fabrication Cluster

Machining

Grinding stock on surface grinder to produce a flat surface.

Grinding stock on surface grinder to produce two parallel surfaces to .001 of an inch.

Grinding stock on surface grinder to produce two perpendicular surfaces to .001 of an inch.

Grinding stock on surface grinder to produce an angular surface.

Machining stock on a horizontal milling machine to produce parallel surfaces to .001 of an inch.

Machining stock on a horizontal milling machine to produce two perpendicular surfaces to .001 of an inch.

Machining stock on a horizontal milling machine to produce a shoulder to .001 of an inch.

Machining stock on a horizontal milling machine to produce an angular surface.

Welding

Arc welding ferrous metals with A.C. welder to produce a flat butt joint.

Arc welding ferrous metals with A.C. welder to produce a flat lap joint.

Arc welding ferrous metals with A.C. welder to produce a flat outside corner joint.

Arc welding ferrous metals with A.C. welder to produce a horizontal inside corner joint.

Arc welding ferrous metals with A.C. welder to produce a vertical lap joint.

Arc welding ferrous metals with A.C. welder to produce a horizontal tee joint.

Arc welding ferrous metals with D.C. welder to produce a horizontal butt joint.

Arc welding ferrous metals with D.C. welder to produce a flat lap joint.

Arc welding ferrous metals with D.C. welder to produce a flat outside corner joint.

Arc welding ferrous metals with D.C. welder to produce a horizontal inside corner joint.

Arc welding ferrous metals with D.C. welder to produce a horizontal tee joint.

Arc welding ferrous metals with D.C. welder to produce a vertical lap joint.

Pad welding low areas on metal stock to renew stock to original height.

INADEQUATE EXPERIENCE TASKS

FOR WILLIAM STEWART

Metal Forming and Fabrication Cluster

Assembly

Adhering parts with adhesives using hand processes to produce a metal bonded assembly.

LIMITED EXPERIENCE TASKS

FOR WILLIAM STEWART

Metal Forming and Fabrication Cluster

Welding

Arc welding ferrous metals with A.C. welder to produce a flat butt joint.

Arc welding ferrous metals with A.C. welder to produce a flat lap joint.

Arc welding ferrous metals with A.C. welder to produce a flat outside corner joint.

Arc welding ferrous metals with A.C. welder to produce a horizontal inside corner joint.

Arc welding ferrous metals with A.C. welder to produce a horizontal tee joint.

Arc welding ferrous metals with A.C. welder to produce a vertical lap joint.

Arc welding ferrous metals with D.C. welder to produce a horizontal butt joint.

Arc welding ferrous metals with D.C. welder to produce a flat lap joint.

Arc welding ferrous metals with D.C. welder to produce a flat outside corner joint.

Arc welding ferrous metals with D.C. welder to produce a horizontal inside corner joint.

Arc welding ferrous metals with D.C. welder to produce a horizontal tee joint.

Arc welding ferrous metals with D.C. welder to produce a vertical lap joint.

Pad welding low areas on metal stock to renew stock to original height.

Gas welding ferrous metal stock to produce a horizontal butt joint.

Gas welding ferrous metal stock to produce a flat lap joint.

Gas welding ferrous metal stock to produce a horizontal outside corner joint.

Gas welding ferrous metal stock to produce a horizontal inside corner joint.

Gas welding ferrous metal stock to produce a horizontal tee joint.

Gas welding ferrous metal stock to produce a vertical lap joint.

Gas cutting ferrous carbon steels.

Brazing ferrous metals to produce a flat butt joint.

Brazing ferrous metals to produce a horizontal lap joint.

Brazing ferrous metals to produce a horizontal outside corner joint.

Brazing ferrous metals to produce a horizontal inside corner joint.

Brazing ferrous metals to produce a horizontal tee joint.

Brazing ferrous metals to produce a vertical lap joint.

INADEQUATE EXPERIENCE TASKS

FOR TRUMAN DOYLE

Metal Forming and Fabrication Cluster

Assembly

Adhering parts with adhesives using hand processes to produce a metal bonded assembly.

Tightening metal fasteners with hand power tools.

Checking dimensions of details with precision instruments for accurate assembly.

Machining

Grinding stock on surface grinder to produce two perpendicular surfaces to .001 of an inch.

Grinding stock on surface grinder to produce an angular surface.

Machining stock on vertical milling machine to produce two perpendicular surfaces to .001 of an inch.

Machining stock on vertical milling machine to produce a shoulder to .001 of an inch.

Arc welding ferrous metals with D.C. welder to produce a horizontal butt joint.

Arc welding ferrous metals with D.C. welder to produce a flat lap joint.

Arc welding ferrous metals with D.C. welder to produce a flat outside corner joint.

Arc welding ferrous metals with D.C. welder to produce a horizontal inside corner joint.

Arc welding ferrous metals with D.C. welder to produce a horizontal tee joint.

Arc welding ferrous metals with D.C. welder to produce a vertical lap joint.

Gas cutting ferrous carbon steels.

Evaluation of the program. Following the completion of the assigned work for the Spring semester, each teacher was evaluated by a project staff member and the project coordinator. The evaluation was accomplished through the use of a rating scale developed by the project staff. (see Appendix F).

The scale was developed by listing the objectives of the second semester program. Criterion statements were then formulated to indicate the behavior required to perform each objective. A scale from zero to ten was developed to rate each teacher with ten representing maximum performance and zero representing minimum performance of the criterion statement.

The completed scale was used by the project staff to rate each teacher in terms of their performance of the criterion statements for each objective. The data obtained from the evaluation were analyzed by obtaining a mean value for each objective. The mean values were then plotted on a graph to provide a visual presentation of each teacher's achievement during the Spring semester. The evaluation profiles for the teachers are shown in the following section of the report.

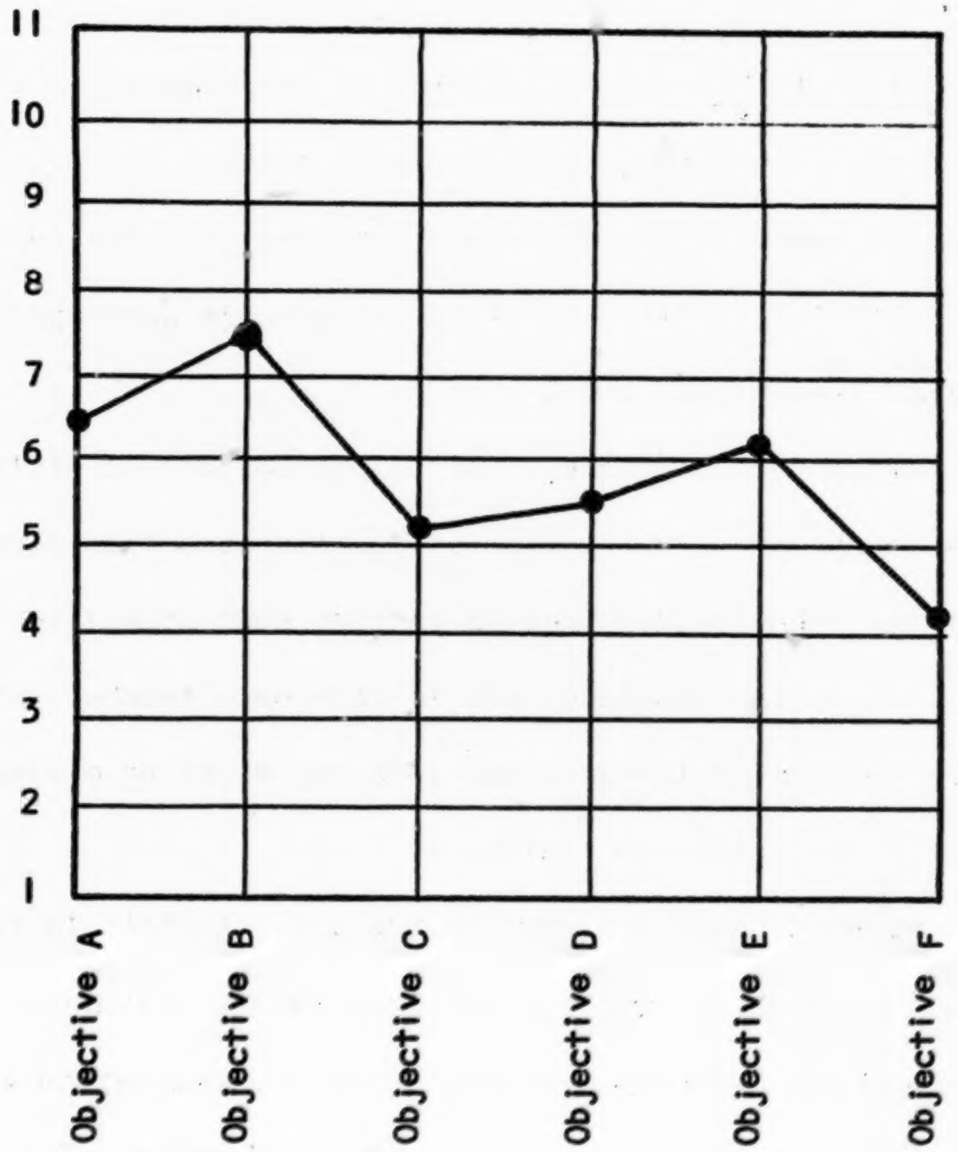

FIGURE 13.

EVALUATION PROFILE FOR TEACHER "A"
SPRING SEMESTER PROGRAM

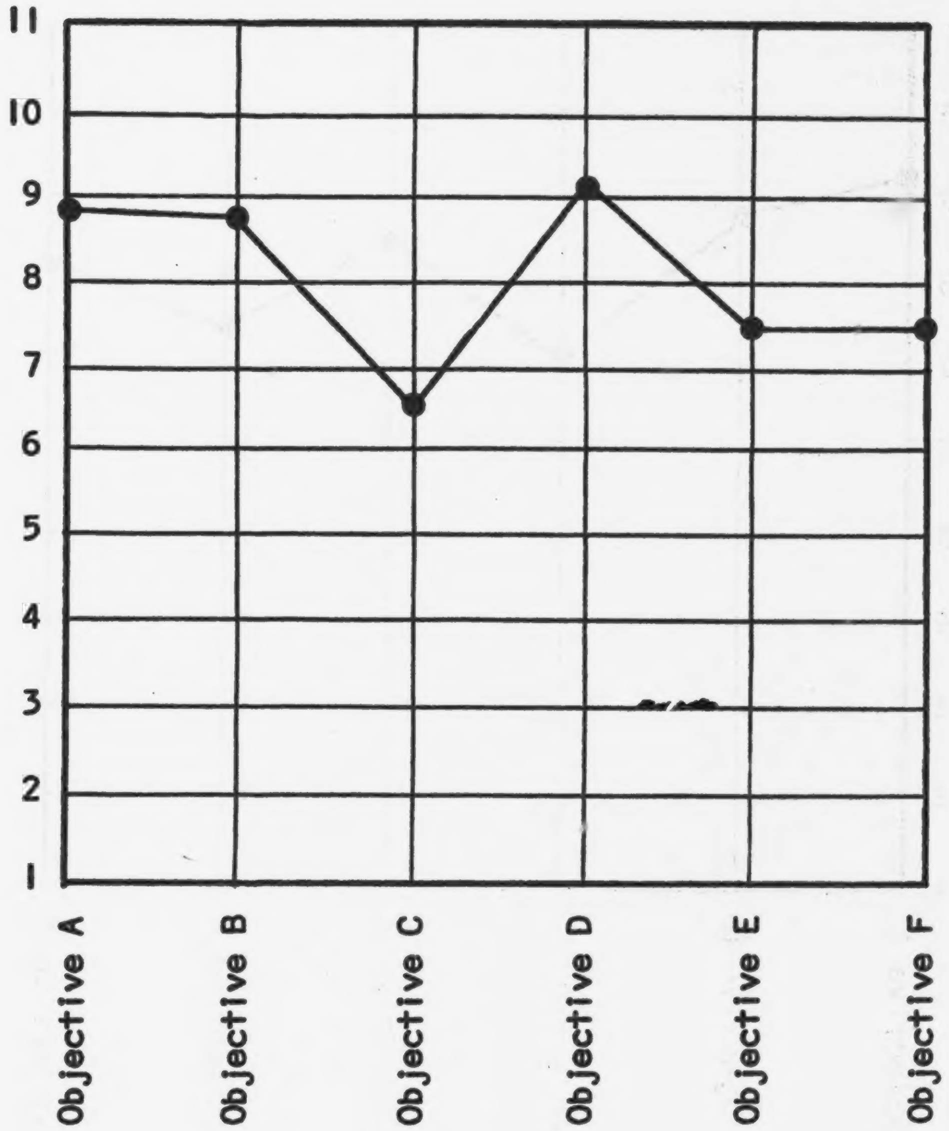

FIGURE 14.

EVALUATION PROFILE FOR TEACHER "B"
SPRING SEMESTER PROGRAM

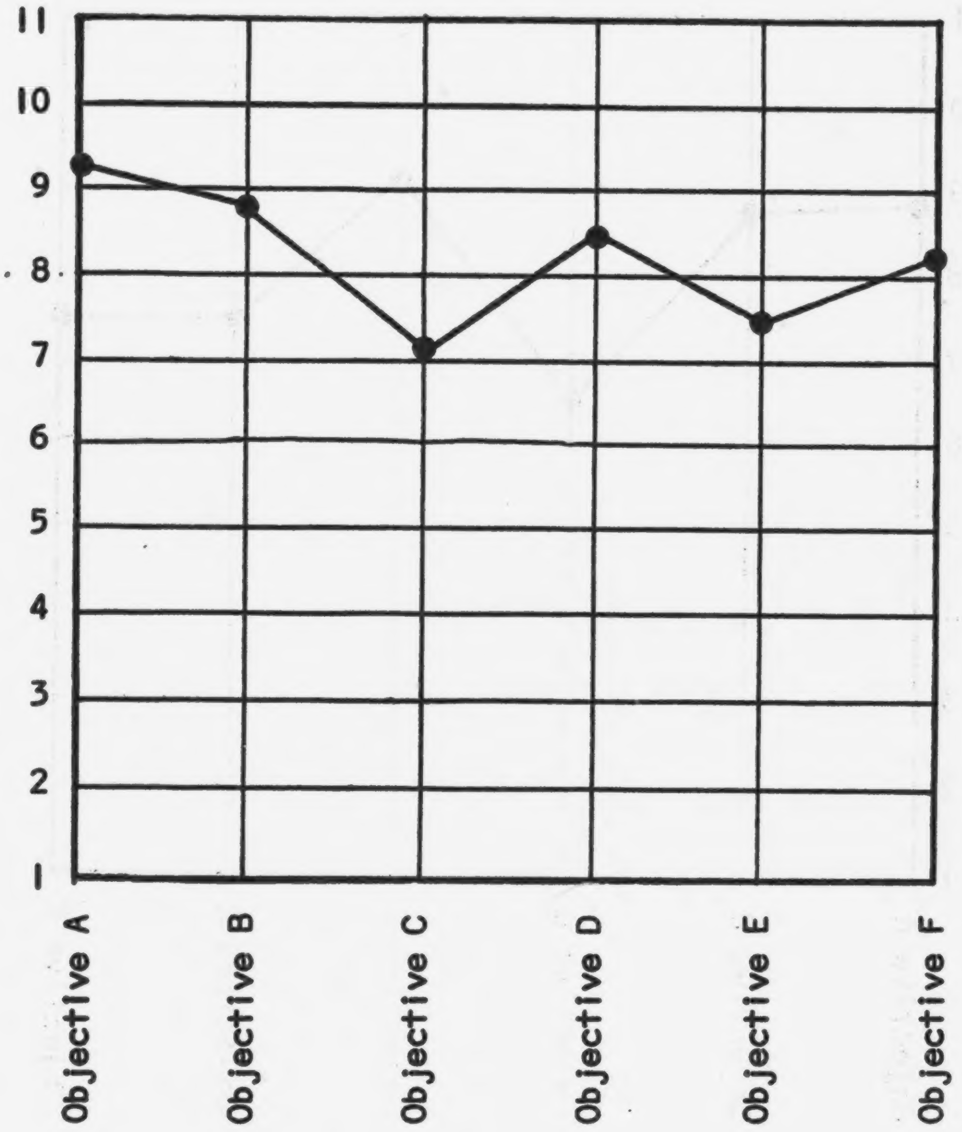

FIGURE 15.

EVALUATION PROFILE FOR TEACHER "C"
SPRING SEMESTER PROGRAM

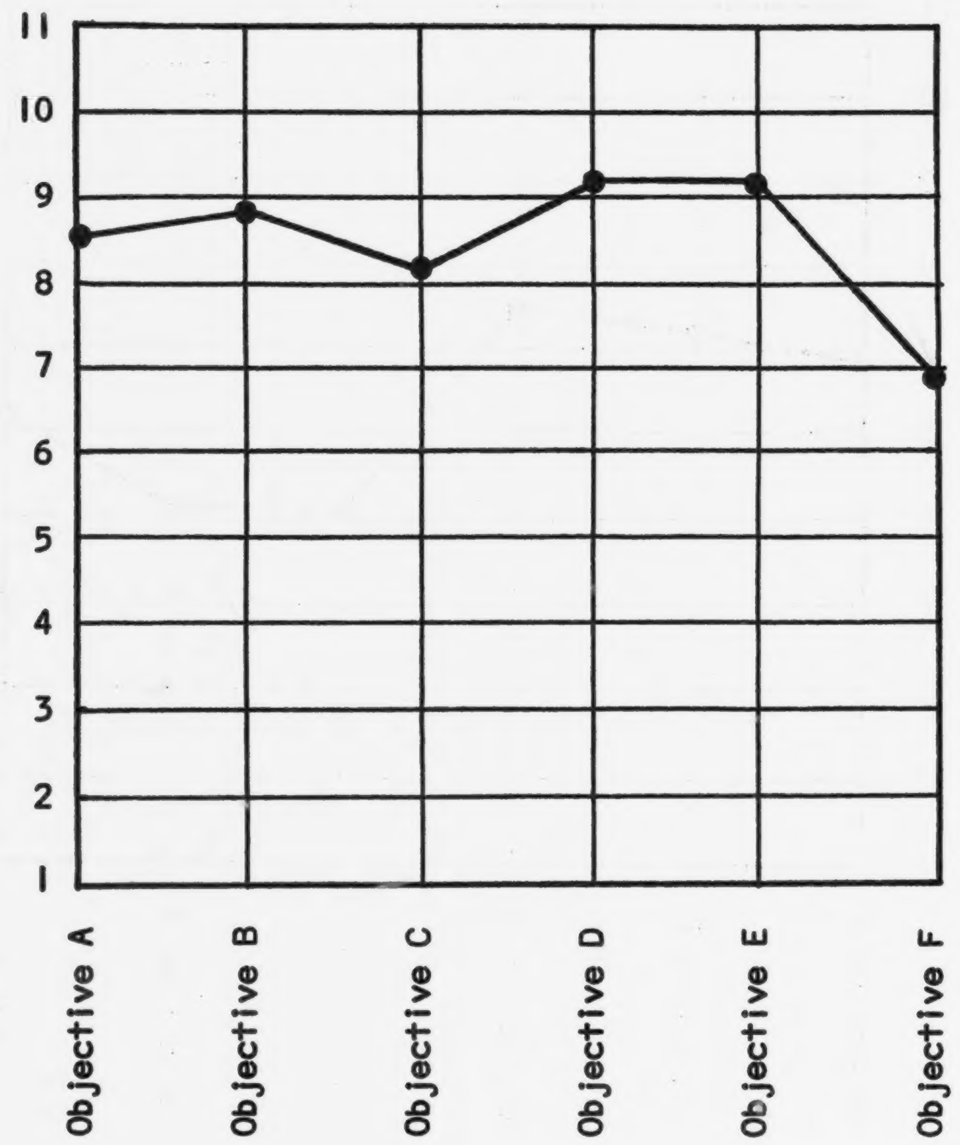

FIGURE 16.

EVALUATION PROFILE FOR TEACHER "D"
SPRING SEMESTER PROGRAM

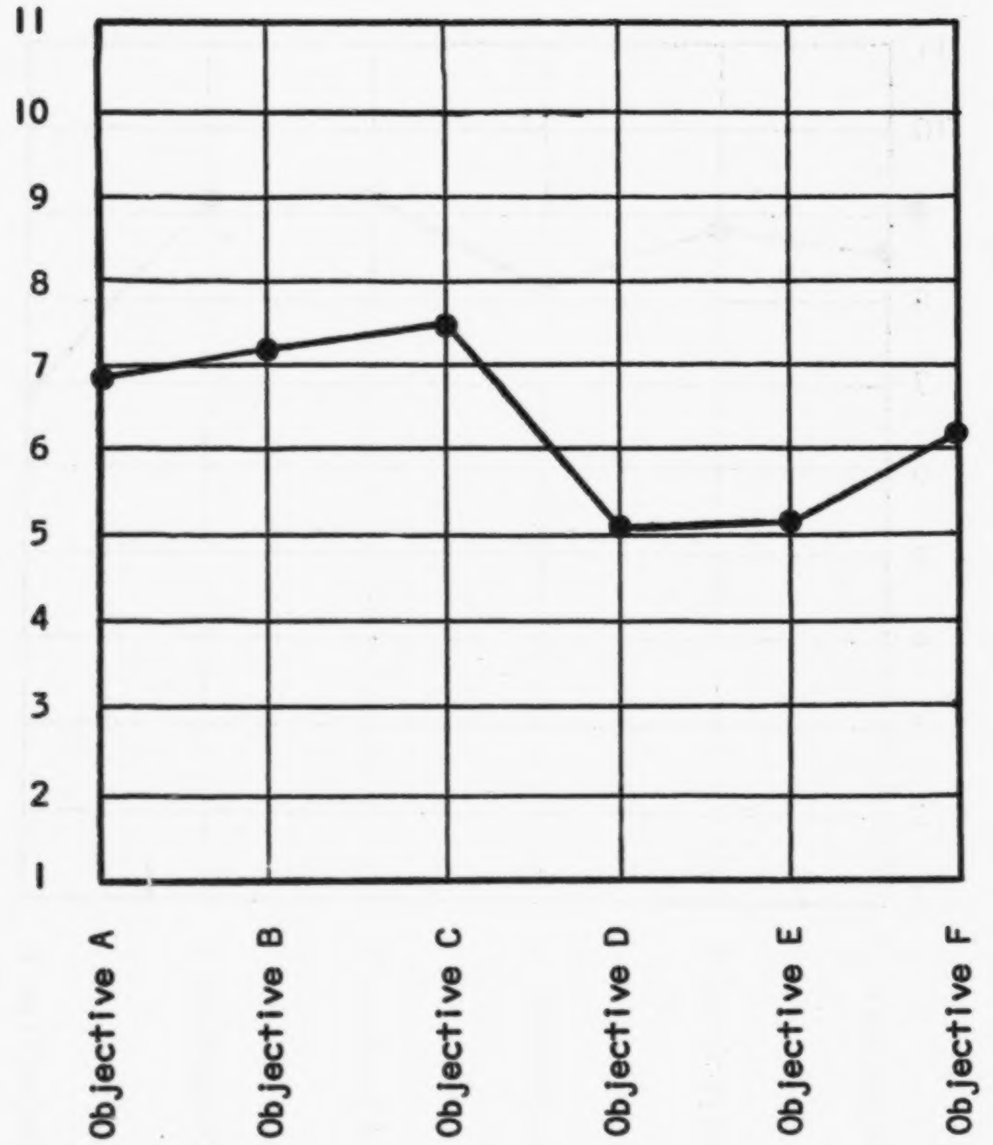

FIGURE 17.

EVALUATION PROFILE FOR TEACHER "E"
SPRING SEMESTER PROGRAM

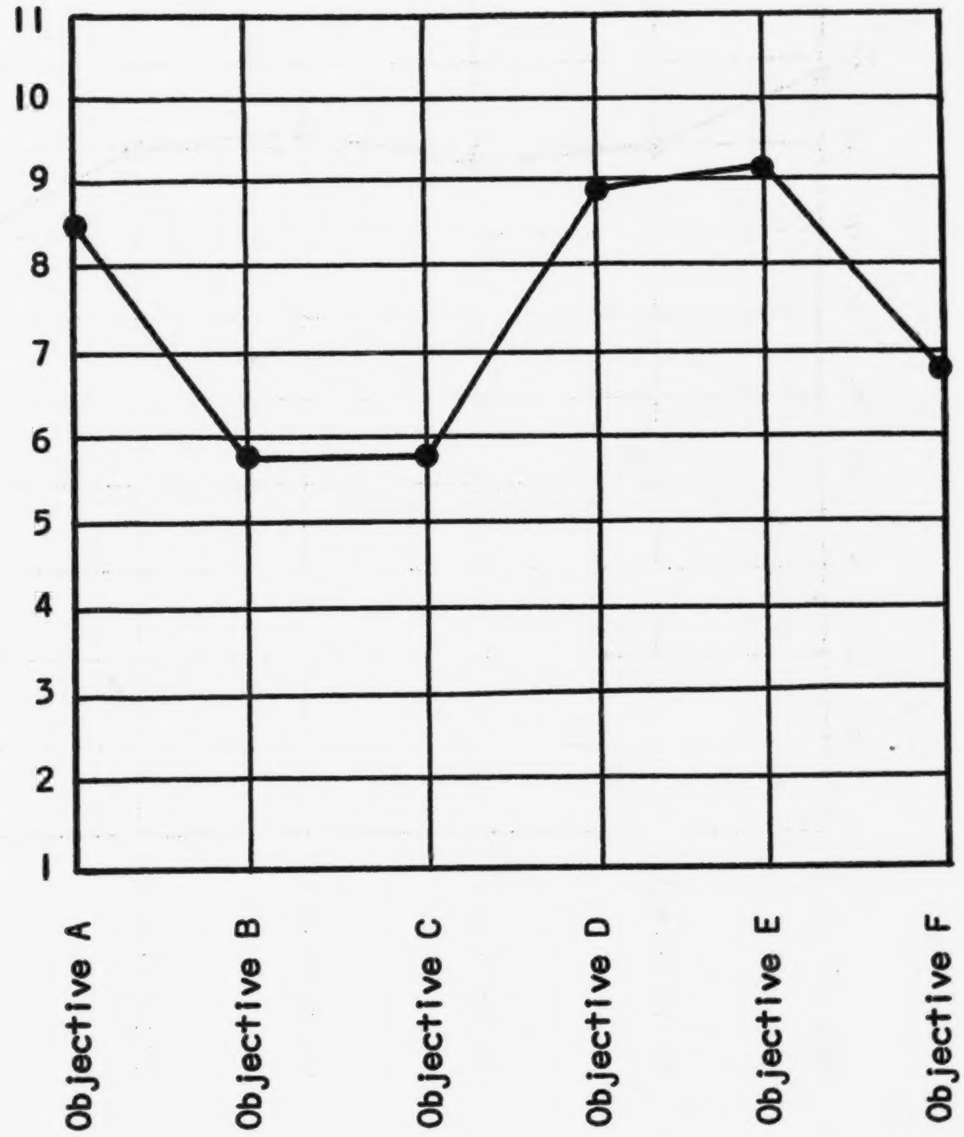

FIGURE 18.

EVALUATION PROFILE FOR TEACHER "F"
SPRING SEMESTER PROGRAM

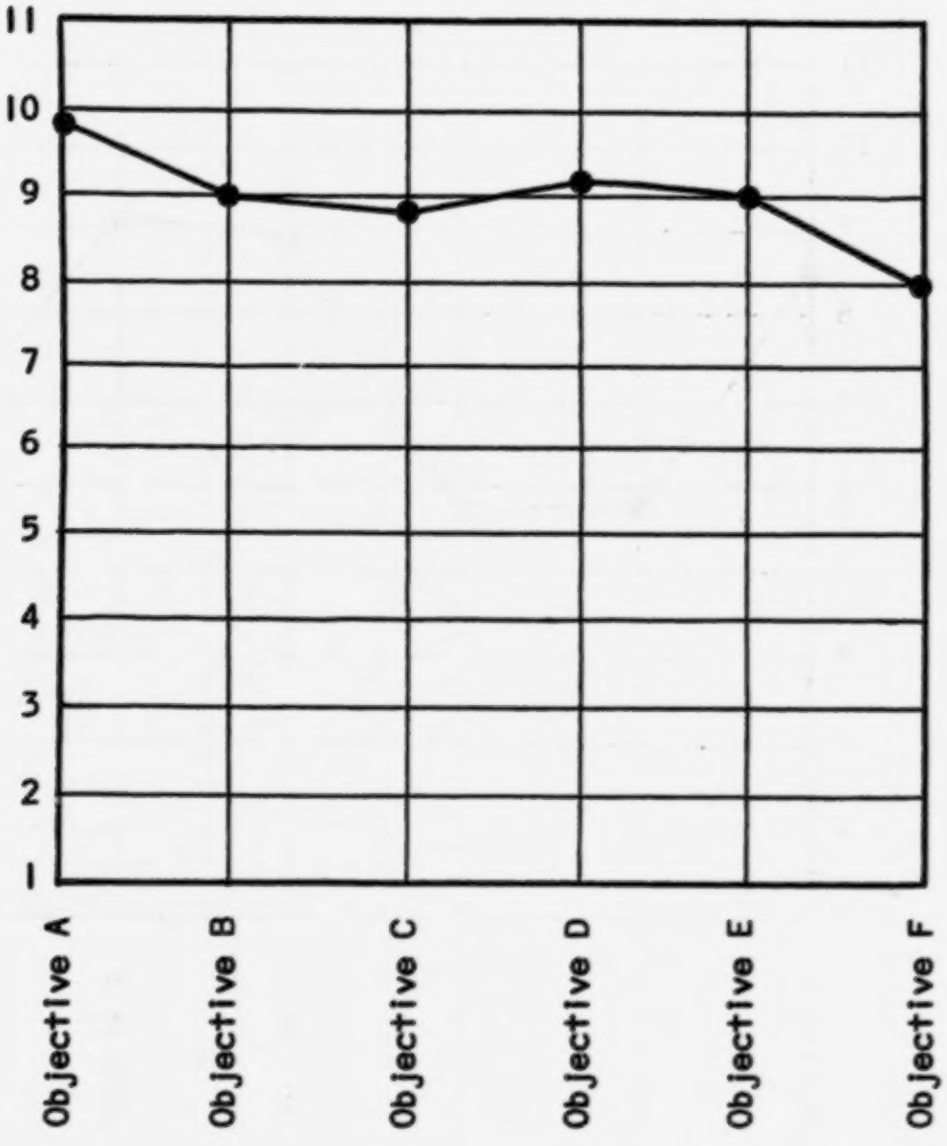

FIGURE 19.

EVALUATION PROFILE FOR TEACHER "G"
SPRING SEMESTER PROGRAM

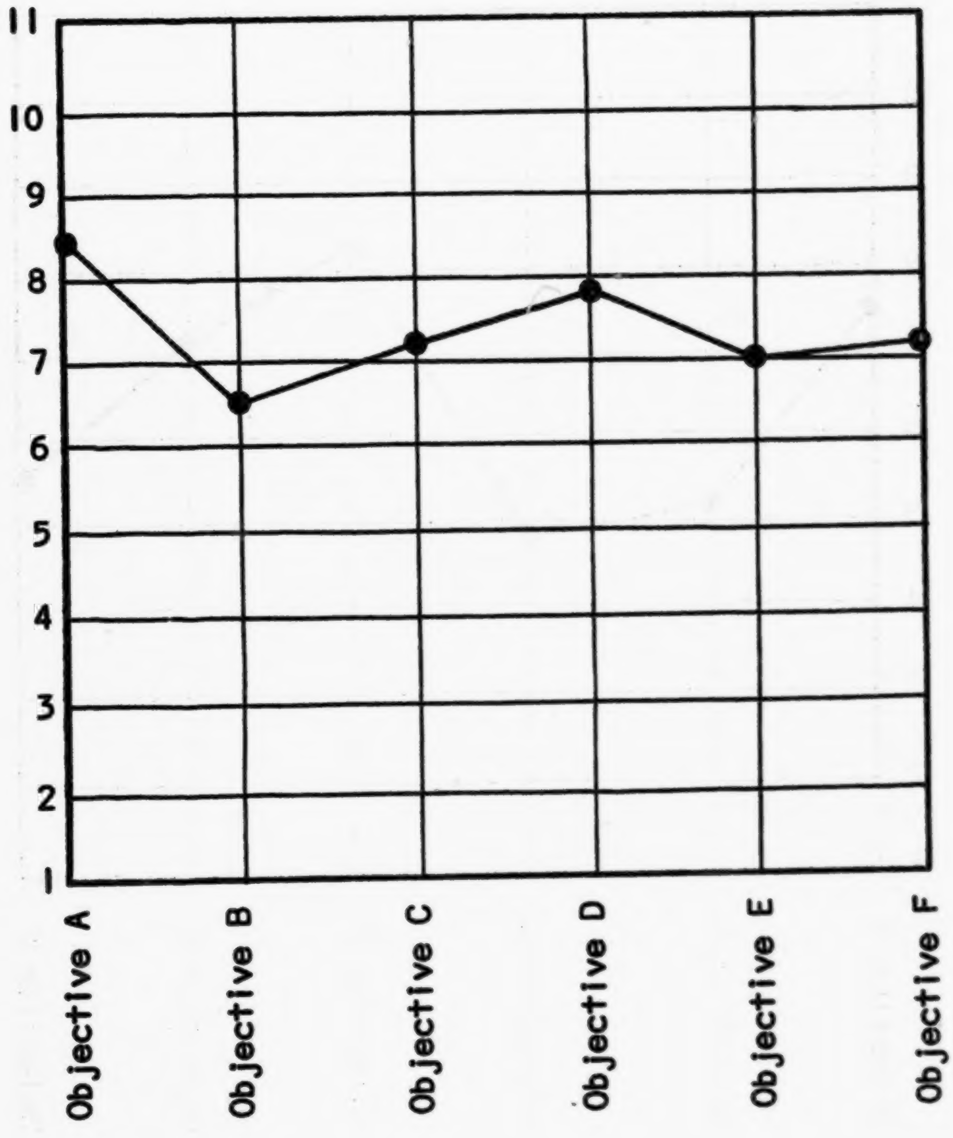

FIGURE 20.

EVALUATION PROFILE FOR TEACHER "H"
SPRING SEMESTER PROGRAM

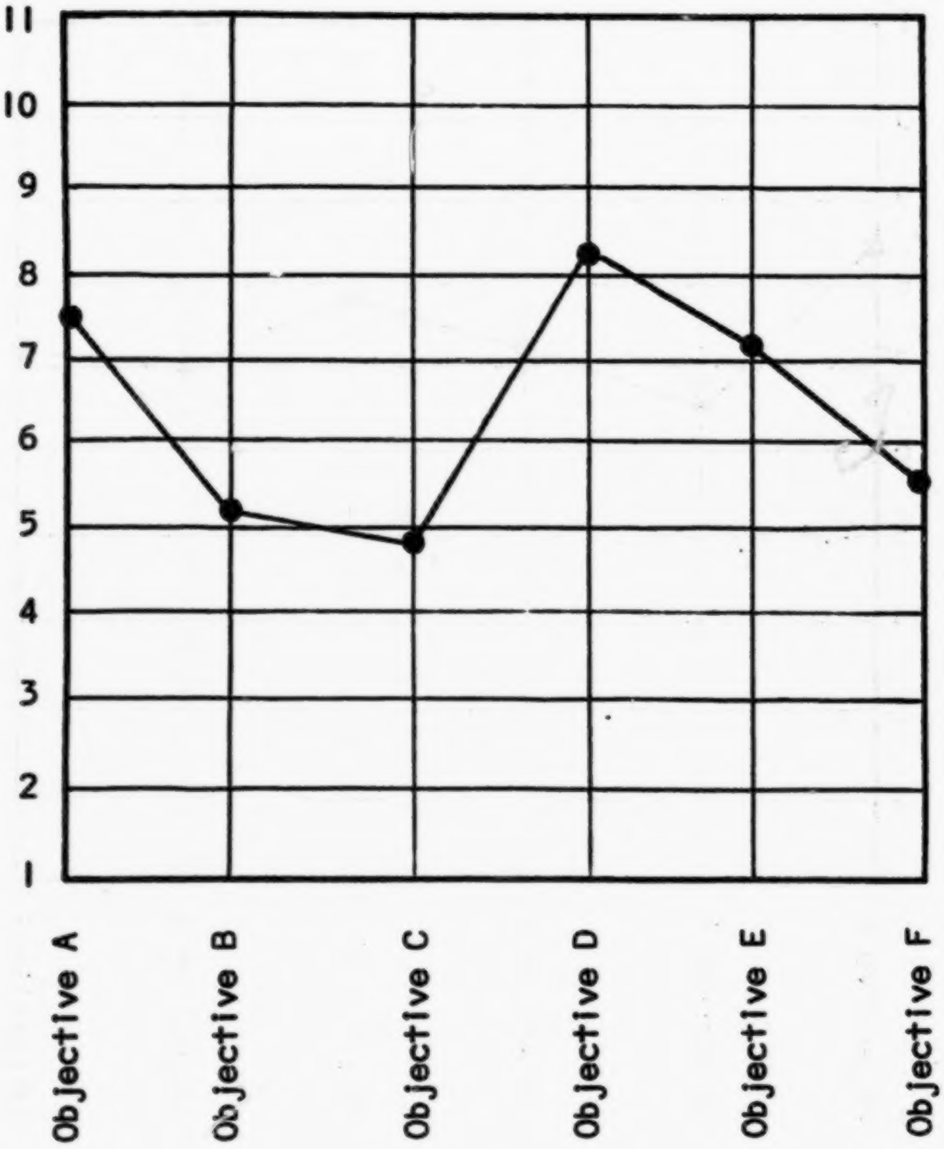

FIGURE 21.

EVALUATION PROFILE FOR TEACHER "I"
SPRING SEMESTER PROGRAM

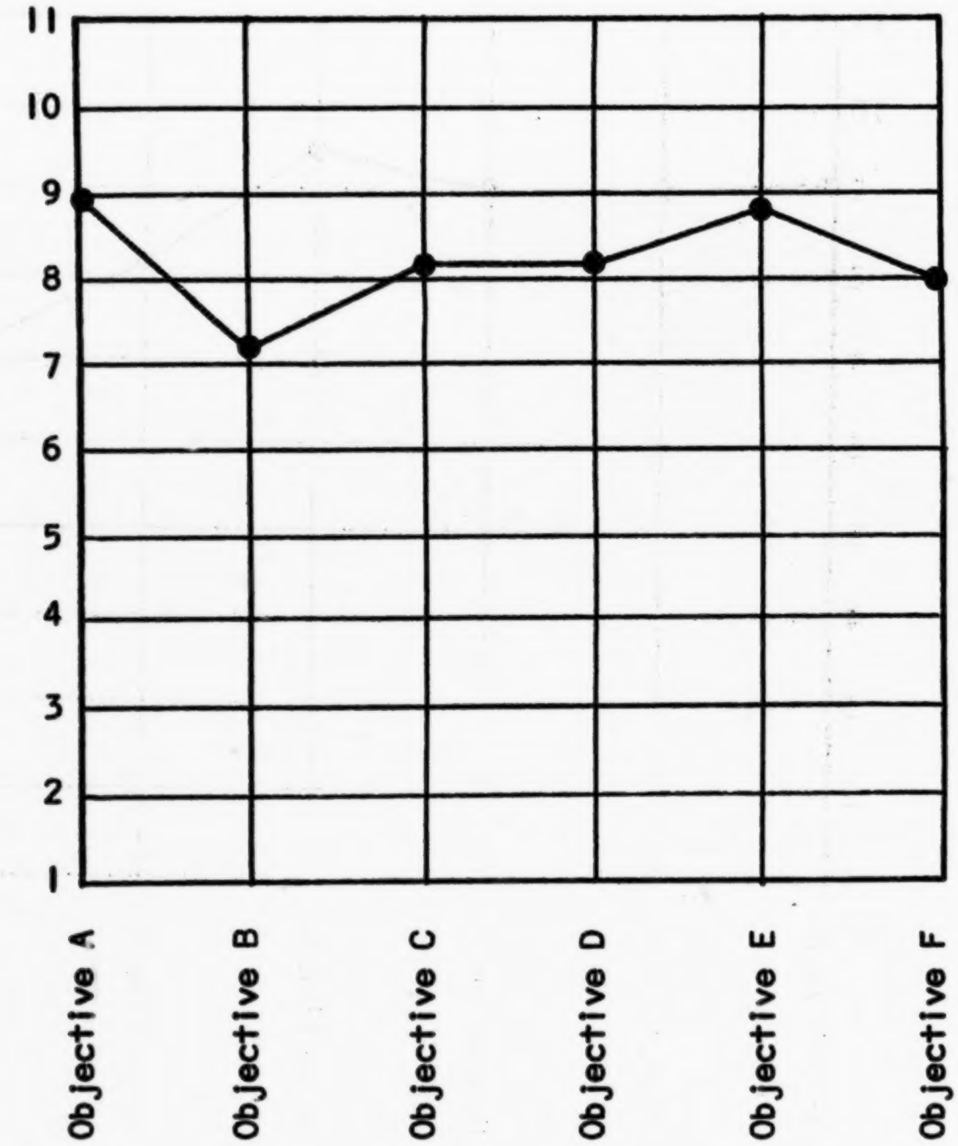

FIGURE 22.

EVALUATION PROFILE FOR TEACHER "J"
SPRING SEMESTER PROGRAM

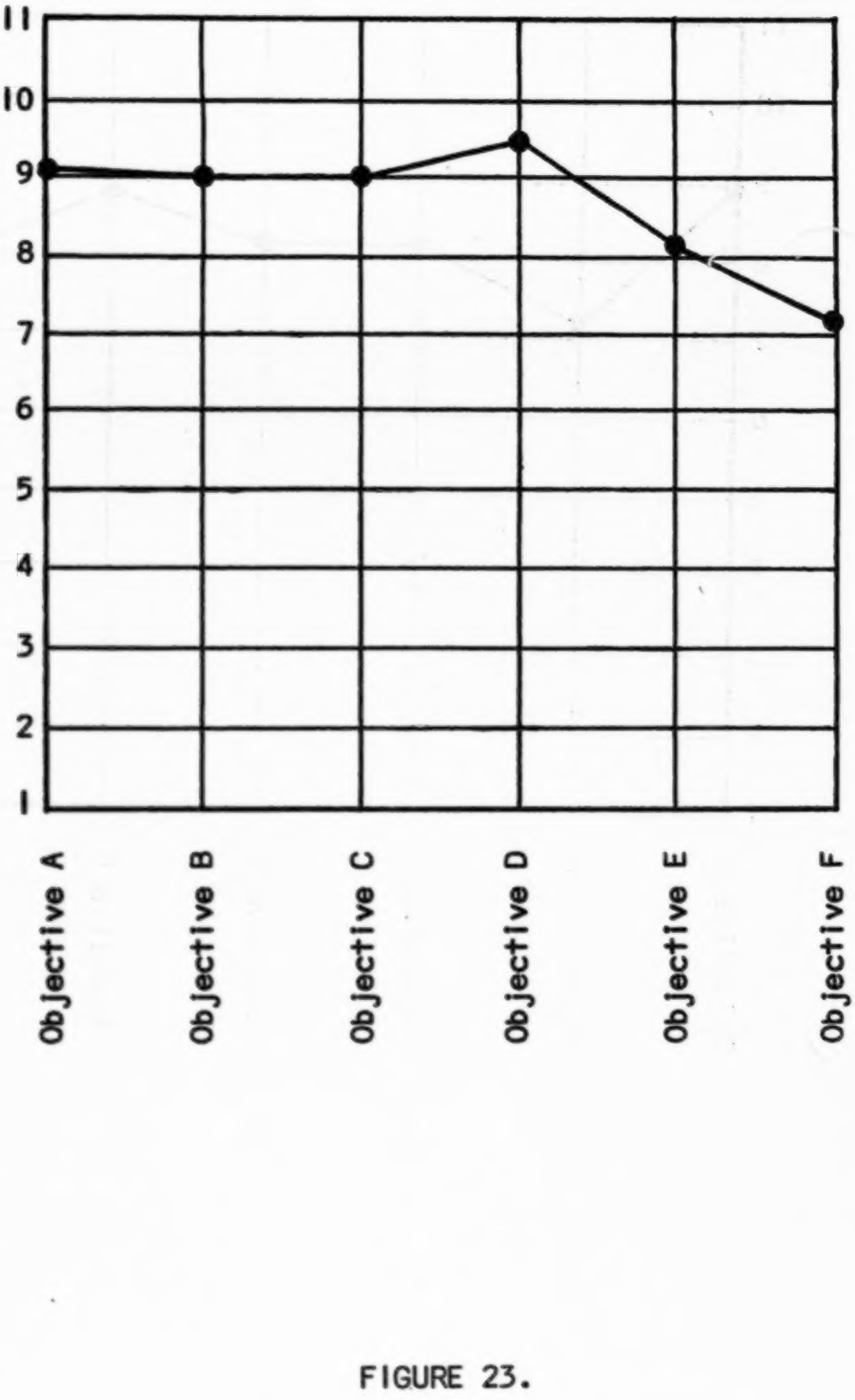

FIGURE 23.

EVALUATION PROFILE FOR TEACHER "K"
SPRING SEMESTER PROGRAM

Summer Workshop Program

Planning the workshop. The development of the Summer workshop program was initiated by the project staff during the latter part of the Spring semester. The major aims of the workshop were: (1) the preparation of teachers with the required technical skills and knowledge needed to implement cluster concept programs; and (2) the preparation of instructional materials needed to teach the occupational clusters.

The technical skills required by each teacher had been identified during the Spring semester as discussed previously in the report. The teachers in the electro-mechanical installation and repair cluster indicated a need for training in all occupational areas of the cluster. The metal forming and fabrication teachers required a minimum amount of preparation in the occupational areas of the cluster with the exception of welding. All of the teachers in the cluster indicated a need for experience with heliarc welding. The teachers of the construction cluster had a general background in all occupational areas of the cluster and required further training only in specific tasks.

In order to secure accurate and up-to-date technical training for the teachers, industries and organizations were approached for possible participation in the workshop program. Contacts were made with numerous individuals in an effort to obtain the required technical instruction. The results obtained from meetings indicated the following representatives of their respective firms and organizations were enthused about the program and would be willing to furnish the required instruction and support for training the teachers.

Mr. Richard Conner
Associated Builders and Contractors
912 Thayer Street
Silver Spring, Maryland

Mr. Maurice Levinshon
Chief
Fabrication Division
Goddard Space Flight Center
Greenbelt, Maryland

Mr. William G. Huelin
District Service Manager
Westinghouse Sales & Service Center
Laurel, Maryland

Mr. Donald A. Jewesak
District Service Manager
Sylvania Electric Products
7819 Yorktown Drive
Alexandria, Virginia

Mr. Robert E. Miller
Manager
National Training Center
Remington Rand Office Machines
Elmira, New York

Mr. John A. Burton
Manager
Custom Engineering
Remington Rand Office Machines
333 Wilson Avenue
South Norwalk, Connecticut

A need for the preparation of instructional materials for use in the implementation of the pilot programs was expressed by the teachers during the Spring semester program. Discussions were held with the teachers during the last two sessions in order to identify ideas for instructional materials in each cluster. The result of these discussions indicated the preparation of an occupational information unit for each cluster would be a valuable resource for the programs. A need for visual aids, such as slides, overlays, and mock-ups was also stated by the participating teachers. The teachers in the metal forming and fabrication cluster and the construction cluster indicated that a group project should be developed in order to integrate many of the job entry tasks in each cluster.

After identifying the technical and instructional needs of the teachers, a program of activities for each cluster was developed by the project team. The program was organized to provide time for developing the technical skills and preparing instructional materials. The schedule, shown in Figures 24, 25 and 26 became the basis for the organization and activities of the Summer workshop.

Activities of the workshop. The Summer workshop program began June 26, and ended August 4, 1967. During this period of time the teachers participated in the activities outlined in schedules shown on pages 80, 81, 82.

Participants in the electro-mechanical cluster were involved, during the first week of the session, in assembling a unit of instruction concerning occupational information for their cluster. Activities here included researching, assimilating, and writing material to be utilized in teaching an occupational information unit. The remainder of the week was spent in planning the construction of instructional materials to be used in the program. (see Appendix H) for a list of instructional materials completed by the teacher-trainees.)

Two training workshops were provided during the second and third weeks of the session. The first of these, conducted by Mr. Donald Jewesak of the Sylvania Electric Corporation, involved training in

JUNE 26 ORIENTATION 8:00 - 12:00 REGISTRATION 1:00 - 4:00	27 DEVELOPMENT OF OCCUPATIONAL INFORMATION 8:00 - 5:00	28 DEVELOPMENT OF OCCUPATIONAL INFORMATION 8:00 - 5:00	29 DEVELOPMENT OF INSTRUCTIONAL MATERIALS 8:00 - 5:00	30 DEVELOPMENT OF INSTRUCTIONAL MATERIALS 8:00 - 5:00
JULY 3 SYLVANIA TRAINING TELEVISION 8:00 - 12:00 DEVELOPMENT OF INSTRUCTIONAL MATERIALS 1:00 - 5:00	4 HOLIDAY	5 SYLVANIA TRAINING TELEVISION 8:00 - 5:00	6 WESTINGHOUSE TRAINING AIR CONDITIONING 8:30 - 4:30	7 WESTINGHOUSE TRAINING AIR CONDITIONING 8:30 - 4:30
10 SYLVANIA TRAINING TELEVISION 8:00 - 5:00	11 WESTINGHOUSE TRAINING APPLIANCES 8:30 - 4:30	12 SYLVANIA TRAINING TELEVISION 8:00 - 5:00	13 DEVELOPMENT OF INSTRUCTIONAL MATERIALS 8:00 - 5:00	14 DEVELOPMENT OF INSTRUCTIONAL MATERIALS 8:00 - 5:00
17 TECHNIFAX WORKSHOP 8:00 - 5:00	18 TECHNIFAX WORKSHOP 8:00 - 5:00	19 TECHNIFAX WORKSHOP 8:00 - 5:00	20 INDIVIDUAL INDUSTRIAL VISITATIONS	21 INDIVIDUAL INDUSTRIAL VISITATIONS
24 REMINGTON TRAINING TYPEWRITERS 8:00 - 5:00	25 REMINGTON TRAINING TYPEWRITERS 8:00 - 5:00	26 REMINGTON TRAINING TYPEWRITERS 8:00 - 5:00	27 REMINGTON TRAINING TYPEWRITERS 8:00 - 5:00	28 REMINGTON TRAINING TYPEWRITERS 8:00 - 5:00
31 REMINGTON TRAINING TYPEWRITERS 8:00 - 5:00	AUGUST 1 REMINGTON TRAINING TYPEWRITERS 8:00 - 5:00	2 REMINGTON TRAINING TYPEWRITERS 8:00 - 5:00	3 REMINGTON TRAINING TYPEWRITERS 8:00 - 5:00	4 REMINGTON TRAINING TYPEWRITERS 8:00 - 5:00

FIGURE 24. SCHEDULE OF ACTIVITIES FOR THE ELECTRO-MECHANICAL INSTALLATION AND REPAIR CLUSTER

JUNE 26 ORIENTATION 8:00 - 12:00 REGISTRATION 1:00 - 4:00	27 DEVELOPMENT OF OCCUPATIONAL INFORMATION 8:00 - 12:00 DEVELOPMENT OF INSTRUCTIONAL MATERIALS 1:00 - 5:00	28 DEVELOPMENT OF OCCUPATIONAL INFORMATION 8:00 - 12:00 DEVELOPMENT OF INSTRUCTIONAL MATERIALS 1:00 - 5:00	29 TRAINING SESSION H. R. GRAYSON & SON, INC. PLUMBING CONTRACTOR JOB SITE 8:00 - 5:00	30 TRAINING SESSION H. R. GRAYSON & SON, INC. PLUMBING CONTRACTOR JOB SITE 8:00 - 5:00
JULY 3 DEVELOPMENT OF OCCUPATIONAL INFORMATION 8:00 - 5:00	4 HOLIDAY	5 DEVELOPMENT OF OCCUPATIONAL INFORMATION 8:00 - 12:00 UNIVERSITY OF MARYLAND CAMPUS BUILDING PROJECTS: CHEMISTRY BLDG., DORMITORY, CYCLATRON 1:00 - 5:00	6 DEVELOPMENT OF OCCUPATIONAL INFORMATION 8:00 - 2:00 HOMEBUILDERS' LABORATORY ROCKVILLE 3:00 - 5:00	7 UNITED ASSOCIATION OF PLUMBERS 8:00 - 12:00 NATIONAL HOUSING CENTER 1:00 - 5:00
10 TRAINING SESSION ASSOCIATED BUILDERS & CONTRACTORS MASONRY JOB SITE 8:00 - 5:00	11 TRAINING SESSION ASSOCIATED BUILDERS & CONTRACTORS MASONRY JOB SITE 8:00 - 5:00	12 DRAWING PLANS FOR UNIFYING PROJECTS FOR USE IN INSTRUCTION 8:00 - 5:00	13 DRAWING PLANS FOR UNIFYING PROJECTS FOR USE IN INSTRUCTION 8:00 - 5:00	14 TRAINING SESSION BRYAN & ASSOCIATES, INC. PAINTING CONTRACTOR 8:00 - 5:00
17 TECHNIFAX WORKSHOP 8:00 - 5:00	18 TECHNIFAX WORKSHOP 8:00 - 5:00	19 TECHNIFAX WORKSHOP 8:00 - 5:00	20 INDIVIDUAL INDUSTRIAL VISITATIONS	21 INDIVIDUAL INDUSTRIAL VISITATIONS
24 TRAINING SESSION KETTLER BROTHERS CARPENTRY JOB SITE 8:00 - 5:00	25 DEVELOPING INSTRUCTIONAL MATERIALS 8:00 - 5:00	26 DEVELOPING INSTRUCTIONAL MATERIALS 8:00 - 5:00	27 TRAINING SESSION DRAKE CONTRACTING CO. ELECTRICAL JOB SITE 8:00 - 5:00	28 DEVELOPING INSTRUCTIONAL MATERIALS 8:00 - 5:00
31 DRAWING PLANS FOR UNIFYING PROJECTS FOR USE IN INSTRUCTION 8:00 - 5:00	AUGUST 1 DRAWING PLANS FOR UNIFYING PROJECTS FOR USE IN INSTRUCTION 8:00 - 5:00	2 MAKING BLUEPRINTS FOR EACH TEACHER OF THE SUGGESTED UNIFYING PROJECTS 8:00 - 5:00	3 DEVELOPING INSTRUCTIONAL MATERIALS 8:00 - 5:00	4 EVALUATION

FIGURE 25. SCHEDULE OF ACTIVITIES FOR THE CONSTRUCTION CLUSTER

JUNE 26 ORIENTATION 8:00 - 12:00 REGISTRATION 1:00 - 4:00	27 DEVELOPMENT OF OCCUPATIONAL INFORMATION 8:00 - 5:00	28 NASA TOUR 8:00 - 12:00 NASA WORKSHOP 1:00 - 5:00	29 NASA WORKSHOP 8:00-- 5:00	30 GENERAL MOTORS TOUR DEVELOPMENT OF INSTRUCTIONAL MATERIALS
JULY 3 NASA WORKSHOP 8:00 - 5:00	4 HOLIDAY	5 NASA WORKSHOP 8:00 - 5:00	6 NASA WORKSHOP 8:00 - 5:00	7 NASA WORKSHOP 8:00 - 5:00
10 NASA WORKSHOP 8:00 - 5:00	11 NASA WORKSHOP 8:00 - 5:00	12 NASA WORKSHOP 8:00 - 5:00	13 NASA WORKSHOP 8:00 - 5:00	14 NASA WORKSHOP 8:00 - 5:00
17 TECHNIFAX WORKSHOP 8:00 - 5:00	18 TECHNIFAX WORKSHOP 8:00 - 5:00	19 TECHNIFAX WORKSHOP 8:00 - 5:00	20 INDIVIDUAL INDUSTRIAL VISITATIONS	21 INDIVIDUAL INDUSTRIAL VISITATIONS
24 DEVELOPMENT OF INSTURCTIONAL MATERIALS 8:00 - 5:00	25 INDUSTRIAL FIELD TRIPS FAIRCHILD AIRCRAFT LANDIS TOOL & MACHINE CO.	26 DEVELOPMENT OF INSTRUCTIONAL MATERIALS 8:00 - 5:00	27 DEVELOPMENT OF INSTRUCTIONAL MATERIALS 8:00 - 5:00	28 DEVELOPMENT OF INSTRUCTIONAL MATERIALS 8:00 - 5:00
31 DEVELOPMENT OF INSTRUCTIONAL MATERIALS 8:00 - 5:00	AUGUST 1 DEVELOPMENT OF INSTRUCTIONAL MATERIALS 8:00 - 5:00	2 DRAWING PLANS FOR UNIFYING PROJECTS 8:00 - 5:00	3 MAKING BLUEPRINTS OF THE SUGGESTED UNIFYING PROJECTS 8:00 - 5:00	4 EVALUATION

FIGURE 26. SCHEDULE OF ACTIVITIES FOR THE METAL FORMING AND FABRICATION CLUSTER

television servicing and included practical experience for the participants. The duration of the program was twenty-eight hours of instruction and was well received by all the trainees.

A second workshop was conducted by the Westinghouse Electric Corporation for training in home appliance and air conditioning servicing. Under the direction and guidance of Mr. Robert Anger, the participants gained experience in the disassembly, repair, and re-assembly of major home appliances and air conditioners. The duration of this program was twenty-four hours of instruction.

During the fourth week the trainees participated in a three-day workshop conducted by the Tecnifax Corporation and learned techniques for constructing visual transparencies. The final two days were utilized by the participants to contact business firms in their school areas which would be willing to serve as consultants to the program during the school year. Almost all of the firms contacted offered their full support to the program.

The final two weeks of training in the electro-mechanical area were provided by the Remington Rand Corporation. Under the guidance of Mr. Charles Sherry, the participants experienced a complete training course programmed on audio tapes. Each trainee, while listening to audio tapes, disassembled, assembled and adjusted his own machine using tools and equipment supplied by Remington.

During the final day of the Summer session, the participants and cluster concept staff members met and discussed the merits and limitations of the workshop. All the trainees felt the program had given them an adequate background to begin teaching the electro-mechanical cluster. In addition, the desire was expressed for a second workshop to be held the following Summer to allow more in-depth training.

Although the task of training the program participants in four different areas in only six weeks was of considerable magnitude, the support and facilities offered by the three cooperating firms was recognized as the major factor which made the Summer session a success.

The participants in the construction cluster spent over one-third of the time during the six-week Summer session on field trips to construction sites in the local area. The Associated Builders and Contractors of Silver Spring, Maryland assisted in contacting firms employing the five occupations in the construction cluster. These contacts were followed up by members of the project staff who made definite appointments for the teacher-trainees to visit the construction sites. In addition, each contractor was sent a list of tasks in which the teachers felt they had limited or inadequate experience. Additional arrangements for visits were made through direct contacts by members of the cluster concept project staff.

The first field trips were conducted on June 29th and 30th when the teacher-trainees visited an office building and a church to observe plumbing contractors at work. The men were able to practice several plumbing tasks and observe the installation of duct work for an air conditioning system.

On the afternoon of July 5th, three construction projects on the University of Maryland campus were visited by the construction cluster group. Brick and concrete block laying, air conditioning installation, running wire in conduit, and rough plumbing operations were observed in the construction of an addition to a chemistry building. A dormitory in the final stage of construction was visited and the teacher-trainees were able to observe finish carpenters, cabinet makers, and painters at work. It was possible to see many of the construction features of the eight story building during this visit. At the physics building, the teachers visited an addition which houses a cyclatron. Observations were made of reinforced concrete construction.

On the afternoon of July 6th, the teacher-trainees visited the Homebuilders Laboratory in Rockville. The purpose of this organization is to test building materials and develop new methods of construction. The teachers saw many experiments underway and received a guided tour of the facility from Mr. Hugh Engleton.

The entire day of July 7th was spent in Washington, D.C. During the morning the group visited the United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry as guests of Mr. Joseph Corcoran who is director of training. The United Association is a leading trade union in the development of educational programs. The teacher-trainees saw many unique training aids in the form of charts, models, filmstrips, and transparencies. The men were inspired not only by the variety of materials they saw, but also by the presentation which Mr. Corcoran made. The afternoon was spent at the National Housing Center viewing the three floors of displays featuring the latest in building materials and home appliance installations. The teachers were able to obtain brochures which further explained many of the materials they observed during their visit.

A visit was made to a construction site on Monday, July 10th where a masonry contractor was at work. This was a school construction job and the men were able to see many phases of masonry construction, including some of the latest developments in concrete block products.

The entire day of Tuesday, July 11th was spent at the Fairmont Heights High School where John Burrell, a masonry expert among the teacher-trainees, gave basic instruction in bricklaying. All the men were able to have direct experience in mixing mortar and laying brick.

Specialists in painting and decorating hosted the group on Friday, July 14th, where the teachers spent several hours visiting job sites and observing painters at work preparing surfaces and applying finishing materials.

During the fourth week the teacher-trainees participated in a three-day workshop conducted by the Tecnifax Corporation and learned techniques for constructing visual transparencies.

On Thursday and Friday, July 20th and 21st, each teacher-trainee visited four building contractors in the localities where they would be conducting their pilot program of the cluster concept. The purposes of these visits were to: (1) acquaint local employers with the objectives of the program; (2) to enlist their aid as possible resource people; (3) to become aware of locations for field trips; and (4) to attain a better understanding of the construction trades.

The final two off-campus experiences occurred during the fifth week of the Summer session. On Monday, July 24th, the day was spent at Montgomery Village near Gaithersburg, Maryland where a housing development is being built. A variety of architectural models in various stages of construction were visited giving insight into the ways in which large scale builders operate. All five occupations were represented. Two of the teacher-trainees returned to this job site at a later date to take colored slides of the various activities.

An electrical contractor planned a day of activities for the men on Thursday, July 27th. At the construction sites they learned some of the problems of large scale power distribution and were able to practice bending conduit as well as observing many types of installation procedures.

After completing these field experiences the teacher-trainees felt gratified that they had been able to have practical experiences which reinforced the work which they had participated in during the Spring semester and the balance of the Summer session.

Participants in the metal forming and fabrication cluster were involved in a variety of activites during the first week of the session. One-and-a-half days were spent in assembling a unit of instruction concerning occupational information for their cluster. Activities included researching, assimilating, and writing material to be utilized in teaching an occupational information unit.

Two days were spent in workshop sessions conducted by the National Aeronautics and Space Administration. All NASA sessions were held at the Goddard Space Flight Center, Greenbelt, Maryland. Activities engaged in during NASA workshops included training and practical experience in the areas of sheet metal, assembly, welding, and machining. The last half day of the first week involved a field trip to the General Motors Assembly Plant in Baltimore, Maryland. This trip provided the teacher-trainees with an opportunity to observe large scale assembly procedures.

NASA workshops were provided during the second and third weeks of the session. This provided the teacher-trainees with additional experiences in the areas listed above.

The schedule on the following page explains the allocation of each trainee's time for all the sessions conducted by NASA. The last day at NASA provided each teacher-trainee with an opportunity to obtain additional information, and experience in an area in which he was specifically interested.

During the fourth week the teacher-trainee participated in a three-day workshop conducted by the Tecnifax Corporation and learned techniques for constructing visual transparencies. The final two days were utilized by the participants to contact industrial firms in their local school areas that would be willing to servie as consultants to the program during the school year.

During the final two weeks of the session, the teacher-trainees were involved in developing instructional materials to be used in teaching certain concepts in the program. Time was also spent developing instructional plans for a unifying project to be built in the actual forming and fabrication cluster. This project involved operations in all the areas taught in the particular cluster. One day during this period was spent visiting Fairchild Aircraft as well as the Landis Tool and Machine Company. This trip provided the teacher-trainees with an opportunity to view various industrial operations involving machining, welding, sheet metal, and assembly procedures.

June 28	29	July 3	5	6
Tour of NASA Facilities for all teachers	Harrison - Assembly Stewart - Sheet Metal Doyle - Welding Slimmer - Machining	Harrison - Welding Stewart - Sheet Metal Doyle - Machining Slimmer - Assembly	Harrison - Welding Stewart - Assembly Doyle - Machining Slimmer - Welding	Harrison - Welding Stewart - Machining Doyle - Machining Slimmer - Welding
Harrison - Sheet Metal Stewart - Assembly Doyle - Welding Slimmer - Machining	Harrison - Welding Stewart - Machining Doyle - Assembly Slimmer - Sheet Metal	Harrison - Assembly Stewart - Welding Doyle - Sheet Metal Slimmer - Machining	Harrison - Machining Stewart - Welding Doyle - Sheet Metal Slimmer - Sheet Metal	Harrison - Machining Stewart - Welding Doyle - Welding Slimmer - Sheet Metal
July 7	10	11	12	13
Harrison - Welding Stewart - Sheet Metal Doyle - Machining Slimmer - Assembly	Harrison - Welding Stewart - Assembly Doyle - Machining Slimmer - Welding	Harrison - Machining Stewart - Welding Doyle - Sheet Metal Slimmer - Welding	Harrison - Sheet Metal Stewart - Welding Doyle - Welding Slimmer - Machining	Harrison - Welding Stewart - Welding Doyle - Sheet Metal Slimmer - Assembly
Harrison - Assembly Stewart - Welding Doyle - Sheet Metal Slimmer - Machining	Harrison - Machining Stewart - Welding Doyle - Sheet Metal Slimmer - Sheet Metal	Harrison - Machining Stewart - Welding Doyle - Welding Slimmer - Machining	Harrison - Machining Stewart - Welding Doyle - Machining Slimmer - Welding	Harrison - Machining Stewart - Welding Doyle - Sheet Metal Slimmer - Welding

FIGURE 27. INDIVIDUAL ACTIVITIES FOR THE METAL FORMING AND FABRICATION TEACHERS

Evaluation of the workshop. The evaluation of the Summer workshop program was concentrated in three areas. An evaluation was made of: (1) the organization, operation, and activities of the Summer workshop; (2) the achievement of the teachers with respect to the preparation of instructional materials; and (3) the teachers' feeling of competency with respect to the technical skills and knowledge of each cluster.

In order to determine each teacher's attitude about his competency in the performance of the skills and knowledge in each cluster, a checklist was developed and given to the teachers at the end of the workshop session. The checklist was composed of the tasks in which the cluster concept teachers originally indicated they had limited or inadequate occupational experience. The teachers were instructed to review the checklist and indicate their feeling of competency in terms of adequate, limited, or inadequate in performing the tasks as a result of the training received during the six-week workshop. The results of the teachers' completion of the checklists are shown in Tables 5 through 15.

The evaluation of the teachers' achievement with respect to the preparation of instructional materials was accomplished by the members of the project team. A rating scale was developed to evaluate the teachers' achievement with respect to: (1) the preparation of an occupational information unit; (2) the preparation of visual aids; and (3) the preparation of drawings for a group project in the construction and metal forming and fabrication cluster. The results of this evaluation are presented in a visual form in Figures 28 through 38.

An evaluation was also made of the organization and activities of the Summer workshop. An instrument was developed (see Appendix J).

TABLE V

MORRIS LAY'S RESPONSES TO TASK EXPERIENCE INVENTORY

Pre-Summer Workshop Response	Post-Summer Workshop Response	Task
		Business Machine Servicing
L	A	Disassembling the typewriter for cleaning.
L	A	Cleaning typewriter to remove dirt.
L	A	Removing the defective part (s) of the typewriter.
L	L	Disassembling the adding machine for cleaning.
L	L	Testing the operation of the repaired adding machine.
		Air Conditioning & Refrigeration Servicing
I	A	Testing lines with detection device for leaks.
I	A	Evacuating the entire system with a vacuum pump to remove all non-condensibles.
L	A	Removing the cover from the unit for ease of servicing.
L	A	Replacing the cover on the unit to restore the original condition.
		Radio and Television Servicing
I	L	Observing the symptoms to determine the defective stage of the radio.
I	A	Checking the tubes in the suspected defective stage of the radio.
I	A	Replacing the defective components in a particular stage of the radio.
I	L	Making final operational checks and adjustments to the radio.
I	L	Observing the symptoms to determine the defective stage of the television set.
I	A	Checking the tubes in the suspected stage.
I	A	Removing the chassis from the cabinet for ease of servicing.
I	A	Replacing the defective components in a particular stage of the television set.

Table V, continued

Pre-Summer Workshop Response	Post-Summer Workshop Response	Task
I	A	Replacing the chassis in the cabinet after a final inspection of the television set.
I	L	Making final operational checks and adjustments to the television set.
L	A	Removing the chassis from the cabinet for ease of servicing.
L	A	Replacing the chassis in the cabinet after a final inspection of the radio.
		Home Appliance Servicing
I	A	Observing the symptoms to determine the defect (s) in an automatic washer.
I	A	Disassembling the automatic washer in order to make the necessary repair (s).
I	A	Replacing the defective part (s) of the automatic washer.
L	A	Observing the symptoms to determine the defect (s) in small heating element appliances.
L	A	Isolating the defect to a particular section of the heating element appliance.
L	A	Isolating the defect to a particular component of the heating element appliance.
L	A	Testing the operations of the repaired small heating element appliance.
L	A	Observing the symptoms to determine the defect (s) in small motor driven appliances.
L	A	Disassembling small electric motor appliances for testing and repairing.
L	A	Isolating the mechanical defects to a particular section of the small electric motor appliances.
L	A	Isolating the electrical defect (s) to a particular section of the small electric motor appliances.
L	A	Isolating the defect to a particular component of the small electric motor appliance.
L	A	Replacing the defective part (s) of the small electric motor appliances.
L	A	Testing the installation of the automatic dryer and making any final adjustments necessary.
L	A	Explaining the operation of the automatic dryer to the customer.
L	A	Disassembling the automatic electric dryer in order to make the necessary repair (s).
L	A	Replacing the defective part (s) of the automatic electric dryer.

Table V, continued

Pre-Summer Workshop Response	Post-Summer Workshop Response	Task
L	A	Making any final adjustments to the repaired automatic electric dryer.
L	A	Disassembling the refrigerator in order to make the necessary repair (s).
L	A	Replacing the defective part (s) of the refrigerator.
L	A	Disassembling the electric range in order to make the necessary repair (s).
L	A	Replacing the defective part (s) of the electric range.
L	A	Reassembling the repaired electric range.
L	A	Making any final adjustments to the repaired electric range.

N.B.

A - indicates adequate task experience
B - indicates limited task experience
C - indicates inadequate task experience

TABLE VI

DONALD CAMPBELL'S RESPONSES TO TASK EXPERIENCE INVENTORY

Pre-Summer Workshop Response	Post-Summer Workshop Response	Task
		Business Machine Servicing
L	A	Disassembling the typewriter for cleaning.
L	A	Cleaning typewriter to remove dirt.
L	A	Removing the defective part (s) of the typewriter.
		Air Conditioning & Refrigeration Servicing
I	A	Testing lines with detection device for leaks.
L	L	Evacuating the entire system with a vacuum pump to remove all non-condensibles.
L	A	Removing the cover from the unit for ease of servicing.
L	A	Replacing the cover on the unit to restore to the original condition.
		Radio and Television Servicing
L	A	Observing the symptoms to determine the defective stage of the radio.
L	A	Making final operational checks and adjustments to the radio.
L	A	Making final operational checks and adjustments to the television set.
		Home Appliance Servicing
L	A	Observing the symptoms to determine the defect (s) in small heating element appliances.
L	A	Disassembling small heating element appliances for testing and repairing.
L	A	Isolating the defect to a particular section of the heating element appliance.
L	A	Replacing the defective part (s) of small heating element appliances.

Table VI, continued

Pre-Summer Workshop Response	Post-Summer Workshop Response	Task
L	L	Making any final adjustments to the repaired automatic electric dryer.
L	A	Retesting the assembled automatic electric dryer.
L	A	Disassembling the refrigerator in order to make the necessary repair (s).
L	A	Replacing the defective part (s) of the refrigerator.
L	L	Testing the operation of the refrigerator.
L	L	Making any final adjustments to the repaired refrigerator.
L	L	Retesting the assembled refrigerator.
L	L	Disassembling the electric range in order to make the necessary repair (s).
L	A	Replacing the defective part (s) of the electric range.
L	A	Reassembling the repaired electric range.
L	A	Testing the operation of the electric range.
L	L	Making any final adjustments to the repaired electric range.
L	A	Retesting the assembled electric range.

Table VI, continued

Pre-Summer Workshop Response	Post-Summer Workshop Response	Task
L	A	Testing the operations of the repaired small heating element appliance.
L	A	Reassembling the repaired small heating element appliance.
L	A	Retesting the assembled small heating element appliance.
L	A	Observing the symptoms to determine the defect (s) in small motor driven appliances.
L	A	Isolating the mechanical defects to a particular section of the small electric motor appliances.
L	A	Isolating the electrical defect (s) to a particular section of the small electric motor appliances.
L	A	Isolating the defect to a particular component of the small electric motor appliance.
L	L	Checking the installation of the electric range and making any final adjustments necessary.
L	L	Explaining the operation of the electric range to the customer.
L	L	Testing the installation of the automatic dryer and making any final adjustments necessary.
L	A	Explaining the operation of the automatic dryer to the customer.
L	L	Checking the installation of the automatic washer and making any final adjustments necessary.
L	L	Explaining the operation of the automatic washer to the customer.
L	L	Checking the installation of the refrigerator and making any final adjustments necessary.
L	A	Explaining the operation of the refrigerator to the customer.
L	A	Observing the symptoms to determine the defect (s) in an automatic washer.
L	A	Disassembling the automatic washer in order to make the necessary repair (s).
L	A	Replacing the defective part (s) of the automatic washer.
L	A	Retesting the assembled automatic washer.
L	A	Disassembling the automatic electric dryer in order to make the necessary repair (s).
L	A	Replacing the defective part (s) of the automatic electric dryer.
L	A	Testing the operation of the automatic electric dryer.

TABLE VII

JOHN MILLETT'S RESPONSES TO TASK EXPERIENCE INVENTORY

Pre-Summer Workshop Response	Post-Summer Workshop Response	Task
		Business Machine Servicing
I	A	Disassembling the typewriter for cleaning.
I	A	Cleaning typewriter to remove dirt.
I	L	Removing the defective part (s) of the typewriter.
I	I	Disassembling the adding machine for cleaning.
I	I	Testing the operation of the repaired adding machine.
		Air Conditioning & Refrigeration Servicing
I	A	Testing lines with detection device for leaks.
I	A	Evacuating the entire system with a vacuum pump to remove all non-condensibles.
I	A	Removing the cover from the unit for ease of servicing.
I	A	Replacing the cover on the unit to restore the original condition.
		Radio & Television Servicing
I	L	Observing the symptoms to determine the defective stage of the radio.
I	A	Checking the tubes in the suspected defective stage of the radio.
I	L	Replacing the defective components in a particular stage of the radio.
I	A	Removing the chassis from the cabinet for ease of servicing.

Table VII, continued

Pre-Summer Workshop Response	Post-Summer Workshop Response	Task
I	A	Replacing the chassis in the cabinet after a final inspection of the television set.
I	A	Replacing the chassis in the cabinet after a final inspection of the radio.
I	L	Making final operational checks and adjustments to the radio.
I	L	Observing the symptoms to determine the defective stage of the television set.
I	A	Checking the tubes in the suspected stage.
I	L	Replacing the defective components in a particular stage of the television set.
I	A	Making final operational checks and adjustments to the television set.
		Home Appliance Servicing
I	A	Observing the symptoms to determine the defect (s) in small heating element appliances.
I	A	Disassembling small heating element appliances for testing and repairing.
I	A	Isolating the defect to a particular section of the heating element appliance.
I	A	Isolating the defect to a particular component of the heating element appliance.
I	L	Replacing the defective part (s) of small heating element appliance.
I	A	Testing the operations of the repaired small heating element appliance.
I	A	Reassembling the repaired small heating element appliance.
I	A	Retesting the assembled small heating element appliance.
I	A	Observing the symptoms to determine the defect (s) in small motor driven appliances.
I	A	Isolating the mechanical defects to a particular section of the small electric motor appliances.
I	A	Disassembling small electric motor appliances for testing and repairing.
I	A	Isolating the electrical defect (s) to a particular section of the small electric motor appliances.
I	A	Isolating the defect to a particular component of the small electric motor appliance.
I	A	Replacing the defective part (s) of the small electric motor appliances.
I	A	Testing the operation of the repaired small electric motor appliances.

Table VII, continued

Pre-Summer Workshop Response	Post-Summer Workshop Response	Task
I	A	Reassembling the repaired small electric motor appliance.
I	A	Retesting the repaired small electric motor appliances.
I	L	Connecting the electrical supply to the electric range in the home.
I	L	Checking the installation of the electric range and making any final adjustments necessary.
I	A	Explaining the operation of the electric range to the customer.
I	I	Installing the vent system for the automatic dryer in the home.
I	L	Connecting the electrical supply to the automatic dryer in the home.
I	L	Testing the installation of the automatic dryer and making any final adjustments necessary.
I	A	Explaining the operation of the automatic dryer to the customer.
I	A	Connecting the water supply to the automatic washer in the home.
I	L	Connecting the electrical supply to the automatic washer in the home.
I	A	Checking the installation of the automatic washer and making any final adjustments necessary.
I	A	Explaining the operation of the automatic washer to the customer.
I	A	Connecting the electrical supply to the refrigerator and making any final adjustments necessary.
I	A	Explaining the operation of the refrigerator to the customer.
I	L	Observing the symptoms to determine the defect (s) in an automatic washer.
I	L	Disassembling the automatic washer in order to make the necessary repair (s).
I	L	Replaing the defective part (s) of the automatic washer.
I	A	Retesting the assembled automatic washer.
I	A	Disassembling the automatic electric dryer in order to make the necessary repair (s).
I	A	Testing the operation of the automatic electric dryer.
I	L	Making any final adjustments to the repaired automatic electric dryer.
I	L	Retesting the assembled automatic electric dryer.

Table VII, continued

Pre-Summer Workshop Response	Post-Summer Workshop Response	Task
I	A	Disassembling the refrigerator in order to make the necessary repair (s).
I	A	Replacing the defective part (s) of the refrigerator.
I	A	Testing the operation of the refrigerator.
I	A	Making any final adjustments to the repaired refrigerator.
I	A	Retesting the assembled refrigerator.
I	A	Disassembling the electric range in order to make the necessary repair (s).
I	L	Replacing the defective part (s) of the electric range.
I	A	Testing the operation of the electric range.
I	L	Making any final adjustments to the repaired electric range.
I	A	Retesting the assembled electric range.
I	A	Reassembling the repaired electric range.

TABLE VIII

JAMES MASON'S RESPONSES TO TASK EXPERIENCE INVENTORY

Pre-Summer Workshop Response	Post-Summer Workshop Response	Task
		Carpentry
L	A	Applying lap, plywood or composition sheathing for a house.
L	A	Installing fire stops along plate in a house.
L	A	Building a foot rest for shingling a roof on a house.
L	L	Installing blanket, bulk, batt, rigid and metallic insulation in a house.
		Plumbing
I	L	Insulating heating and water lines in a house.
I	L	Installing duct work for warm air heating system in a house.
L	A	Preparing cast iron soil pipe to pour a lead joint for a waste line in a house.
L	A	Preparing lead for pouring soil pipe joints for a house.
L	A	Attaching mounting brackets for plumbing fixtures to masonry construction.
L	L	Assembling a furnace for a house.
L	L	Welding angle iron for pipe hangers.
		Electricity
I	L	Installing rigid, thin wall and flexible conduit in a house.
L	A	Installing boxes for receptacles, switches, junctions and fixtures in a house.
L	A	Installing wiring from box to box in a house.

Table VIII, continued

Pre-Summer Workshop Response	Post-Summer Workshop Response	Task
		Masonry
L	A	Shoring sidewalls of earthen ditches to prevent cave-ins during excavation.
L	A	Cleaning and oiling concrete forms prior to and after use on a building.
L	A	Protecting a concrete slab following finishing operations to provide for proper curing.
L	A	Cleaning out mortar joints for tuck pointing on a masonry wall.
L	A	Pointing up a section of a brick wall to to provide a finished appearance on a house.
L	A	Applying colorless coating to waterproof masonry surfaces above grade on a building.
		Painting
L	A	Preparing a surface for application of stain on the interior or exterior of a house.
L	A	Preparing joints and nail holes in dry wall construction to receive final finish.

TABLE IX

PAUL IMPHONG'S RESPONSES TO TASK EXPERIENCE INVENTORY

Pre-Summer Workshop Response	Post-Summer Workshop Response	Task
		Carpentry
L	L	Erecting girders and columns for a house.
L	A	Installing hangers and anchors for floor joists for a house.
L	A	Installing solid bridging between floor joists for a house.
L	A	Laying roof decking for a house.
L	L	Applying commercial wall board to the interior of a house.
		Plumbing
L	L	Assembling a furnace for a house.
L	L	Installing duct work for warm air heating system in a house.
		Masonry
L	A	Cleaning and oiling concrete forms prior to and after use on a building.
L	L	Shoring sidewalls of earthen ditches to prevent cave-in during excavation.
L	A	Wiring and bolting forms to prevent spreading during pouring.
L	L	Erecting scaffolding for use by a mason at the building site.
L	A	Cleaning out mortar joints for tuck pointing on a masonry wall.
L	L	Pointing up a section of a brick wall to provide a finished appearance on a house.
		Painting
I	A	Preparing joints and nail holes in dry wall construction to receive final finish.
		Electricity
L	A	Installing rigid, thin wall and flexible conduit in a house.

TABLE X

CHARLES BARTON'S RESPONSES TO TASK EXPERIENCE INVENTORY

Pre-Summer Workshop Response	Post-Summer Workshop Response	Task
		Carpentry
I	A	Laying roof decking for a house.
L	A	Installing backing to an interior wall of a house.
L	A	Applying commercial wall board to the interior of a house.
		Masonry
L	A	Shoring sidewalls of earthen ditches to prevent cave-ins during excavation.
L	L	Wiring and bolting forms to prevent spreading during pouring.
L	A	Installing anchor bolts in masonry walls and concrete to provide a place for securing future construction.
L	L	Protecting a concrete slab following finishing operations to provide for proper curing.
L	L	Cleaning out mortar joints for tuck pointing on a masonry wall.
L	L	Pointing up a section of a brick wall to provide a finished appearance on a house.
		Plumbing
I	L	Preparing copper tubing for installation in a plumbing system for a house.
I	L	Welding angle iron for pipe hangers.
I	L	Insulating heating and water lines in a house.
I	L	Assembling a furnace for a house.
I	A	Installing duct work for warm air heating system in a house.
I	A	Preparing cast iron soil pipe to pour a lead joint for a waste line in a house.
I	A	Preparing lead for pouring soil pipe joints for a house.

Table X, continued

Pre-Summer Worksnop Response	Post-Summer Workshop Response	Task
L	L	Preparing pipe for installation in a plumbing or gas supply system in a house.
L	A	Attaching mounting brackets for plumbing fixtures to frame construction.
		Electricity
I	L	Installing rigid, thin wall and flexible condui+ in a house.
L	A	Installing boxes for receptacles, switches, junctions and fixtures in a house.
L	L	Installing wiring from box to box in a house.
L	L	Connecting receptacles, single throw switches, fixtures and pilot lights to complete circuits in a house.
		Painting
I	A	Applying finishing materials to provide protection and decoration of surfaces in or on a house.
L	A	Preparing a surface for application of stain on the interior or exterior of a house.
L	A	Preparing stain and applicator for use on the interior and exterior of a house.
L	A	Preparing clear finishes and applicators for use on the exterior and interior of a house.
L	A	Glazing a window in preparation for painting.

TABLE XI

JOHN BURRELL'S RESPONSES TO TASK EXPERIENCE INVENTORY

Pre-Summer Workshop Response	Post-Summer Workshop Response	Task
		Carpentry
L	A	Erecting girders and columns for a house.
L	A	Installing solid bridging between floor joists for a house.
L	A	Laying subfloors on floor joists for a house.
L	A	Applying lap, plywood or composition sheathing for a house.
		Plumbing
I	L	Welding angle iron for pipe hangers.
I	L	Preparing cast iron soil pipe to pour a lead joint for a waste line in a house.
I	A	Preparing lead for pouring soil pipe joints for a house.
I	I	Assembling a furnace for a house.
L	L	Preparing copper tubing for installation in a plumbing system for a house.
L	L	Preparing pipe for installation in a plumbing or gas supply system in a house.
L	A	Attaching mounting brackets for plumbing fixtures to frame construction.
L	A	Insulating heating and water lines in a house.
		Electricity
L	L	Installing boxes for receptacles, switches, junctions and fixtures in a house.
L	L	Installing wiring from box to box in a house.
L	L	Connecting receptacles, single throw switches, fixtures and pilot lights to complete circuits in a house.
L	L	Installing rigid, thin wall and flexible conduit in a house.

TABLE XII

JACK SLIMMER'S RESPONSES TO TASK EXPERIENCE INVENTORY

Pre-Summer Workshop Response	Post-Summer Workshop Response	Task
		Assembly
I	A	Adhering parts with adhesives using hand processes to produce a metal bonded assembly.
I	I	Adhering parts with adhesives using spray equipment to a specified thickness to produce a metal bonded assembly.
		Machining
L	L	Grinding drill bits on a bench grinder to sharpen tools.
		Welding
L	A	Gas welding ferrous metal stock to produce a vertical lap joint.
L	A	Brazing ferrous metals to produce a vertical lap joint.

Table XII, continued

Pre-Summer Workshop Response	Post-Summer Workshop Response	Task
L	A	Arc welding ferrous metals with A.C. welder to produce a vertical lap joint.
L	A	Arc welding ferrous metals with A.C. welder to produce a horizontal tee joint.
L	A	Arc welding ferrous metals with D.C. welder to produce a horizontal butt joint.
L	A	Arc welding ferrous metals with D.C. welder to produce a flat lap joint.
L	A	Arc welding ferrous metals with D.C. welder to produce a flat outside corner joint.
L	A	Arc welding ferrous metals with D.C. welder to produce a horizontal inside corner joint.
L	A	Arc welding ferrous metals with D.C. welder to produce a horizontal tee joint.
L	A	Arc welding ferrous metals with D.C. welder to produce a vertical lap joint.
L	A	Pad welding low areas on metal stock to renew stock to original height.

TABLE XIII

PORTER HARRISON'S RESPONSES TO TASK EXPERIENCE INVENTORY

Pre-Summer Workshop Response	Post-Summer Workshop Response	Task
		Machining
L	A	Grinding stock on surface grinder to produce a flat surface.
L	A	Grinding stock on surface grinder to produce two parallel surfaces to .001 of an inch.
L	A	Grinding stock on surface grinder to produce two perpendicular surfaces to .001 of an inch.
L	A	Grinding stock on surface grinder to produce an angular surface.
L	A	Machining stock on a horizontal milling machine to produce parallel surfaces to .001 of an inch.
L	A	Machining stock on a horizontal milling machine to produce two perpendicular surfaces to .001 of an inch.
L	A	Machining stock on a horizontal milling machine to produce a shoulder to .001 of an inch.
L	A	Machining stock on a horizontal milling machine to produce an angular surface.
		Welding
L	A	Arc welding ferrous metals with A.C. welder to produce a flat butt joint.
L	A	Arc welding ferrous metals with A.C. welder to produce a flat lap joint.
L	A	Arc welding ferrous metals with A.C. welder to produce a flat outside corner joint.
L	A	Arc welding ferrous metals with A.C. welder to produce a horizontal inside corner joint.

TABLE XIV

WILLIAM STEWART'S RESPONSES TO TASK EXPERIENCE INVENTORY

Pre-Summer Workshop Response	Post-Summer Workshop Response	Task
		Assembly
I	I	Adhering parts with adhesives using hand processes to produce a metal bonded assembly.
		Welding
L	A	Arc welding ferrous metals with A.C. welder to produce a flat butt joint.
L	A	Arc welding ferrous metals with A.C. welder to produce a flat lap joint.
L	A	Arc welding ferrous metals with A.C. welder to produce a flat outside corner joint.
L	A	Arc welding ferrous metals with A.C. welder to produce a horizontal inside corner joint.
L	A	Arc welding ferrous metals with A.C. welder to produce a horizontal tee joint.
L	A	Arc welding ferrous metals with A.C. metals to produce a vertical lap joint.
L	A	Arc welding ferrous metals with D.C. welder to produce a horizontal butt joint.
L	A	Arc welding ferrous metals with D.C. welder to produce a flat lap joint.
L	A	Arc welding ferrous metals with D.C. welder to produce a flat outside corner joint.
L	A	Arc welding ferrous metals with D.C. welder to produce a horizontal inside corner joint.
L	A	Arc welding ferrous metals with D.C. welder to produce a horizontal tee joint.
L	A	Arc welding ferrous metals with D.C. welder to produce a vertical lap joint.
L	A	Pad welding low areas on metal stock to renew stock to original height.
L	A	Gas welding ferrous metal stock to produce a horizontal butt joint.

Table XIV, continued

Pre-Summer Workshop Response	Post-Summer Workshop Response	Task
L	A	Gas welding ferrous metals stock to produce a flat lap joint.
L	A	Gas welding ferrous metals stock to produce a horizontal outside corner joint.
L	A	Gas welding ferrous metal stock to produce a horizontal inside corner joint.
L	A	Gas welding ferrous metals stock to produce a horizontal tee joint.
L	A	Gas welding ferrous metal stock to produce a vertical lap joint.
L	A	Gas cutting ferrous carbon steels.
L	A	Brazing ferrous metals to produce a flat butt joint.
L	A	Brazing ferrous metals to produce a horizontal lap joint.
L	A	Brazing ferrous metals to produce a horizontal outside corner joint.
L	A	Brazing ferrous metals to produce a horizontal inside corner joint.
L	A	Brazing ferrous metals to produce a horizontal tee joint.
L	A	Brazing ferrous metals to produce a vertical lap joint.

TABLE XV

TRUMAN DOYLE'S RESPONSES TO TASK EXPERIENCE INVENTORY

Pre-Summer Workshop Response	Post-Summer Workshop Response	Task
		Sheet Metal
I	A	Forming sheet metal crimping on a crimping machine.
I	A	Forming sheet metal beading on a beading machine.
		Assembly
I	A	Adhering parts with adhesives using hand processes to produce a metal bonded assembly.
I	A	Tightening metal fasteners with hand power tools.
I	A	Checking dimensions of details with precision instruments for accurate assembly.
		Machining
I	I	Grinding stock on surface grinder to produce two perpendicular surfaces to .001 of an inch.
I	I	Grinding stock on surface grinder to produce an angular surface.
I	A	Machining stock on vertical milling machine to produce two perpendicular surfaces to .001 of an inch.
I	A	Machining stock on vertical milling machine to produce a shoulder to .001 of an inch.
I	A	Arc welding ferrous metals with D.C. welder to produce a horizontal butt joint.
I	A	Arc welding ferrous metals with D.C. welder to produce a flat lap joint.
I	A	Arc welding ferrous metals with D.C. welder to produce a flat outside corner joint.
I	A	Arc welding ferrous metals with D.C. welder to produce a horizontal inside corner joint.
I	A	Arc welding ferrous metals with D.C. welder to produce a horizontal tee joint.
I	A	Arc welding ferrous metals with D.C. welder to produce a vertical lap joint.
I	I	Gas cutting ferrous carbon steels.

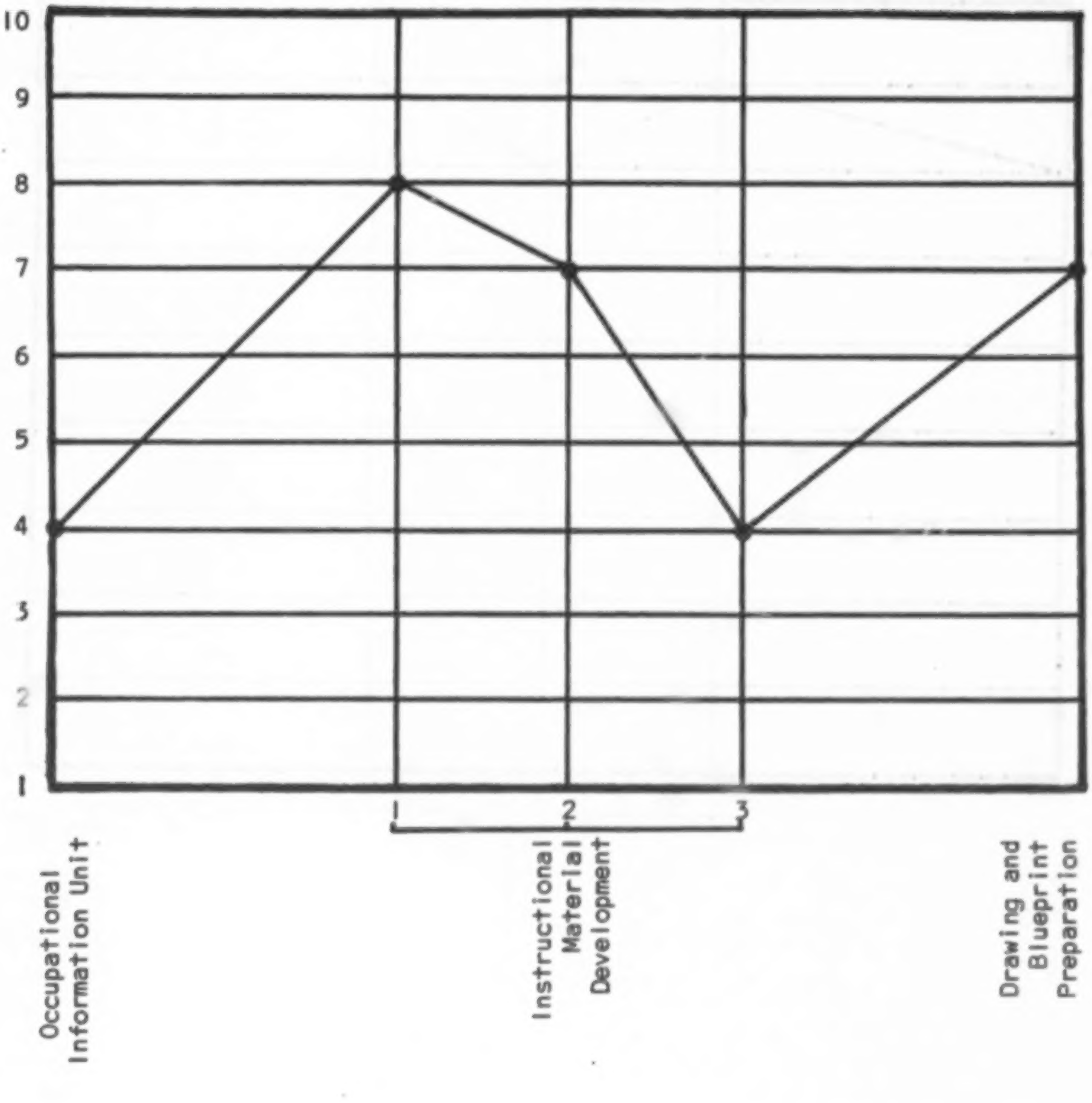

FIGURE 28.

EVALUATION PROFILE FOR TEACHER "A"
SUMMER WORKSHOP PROGRAM

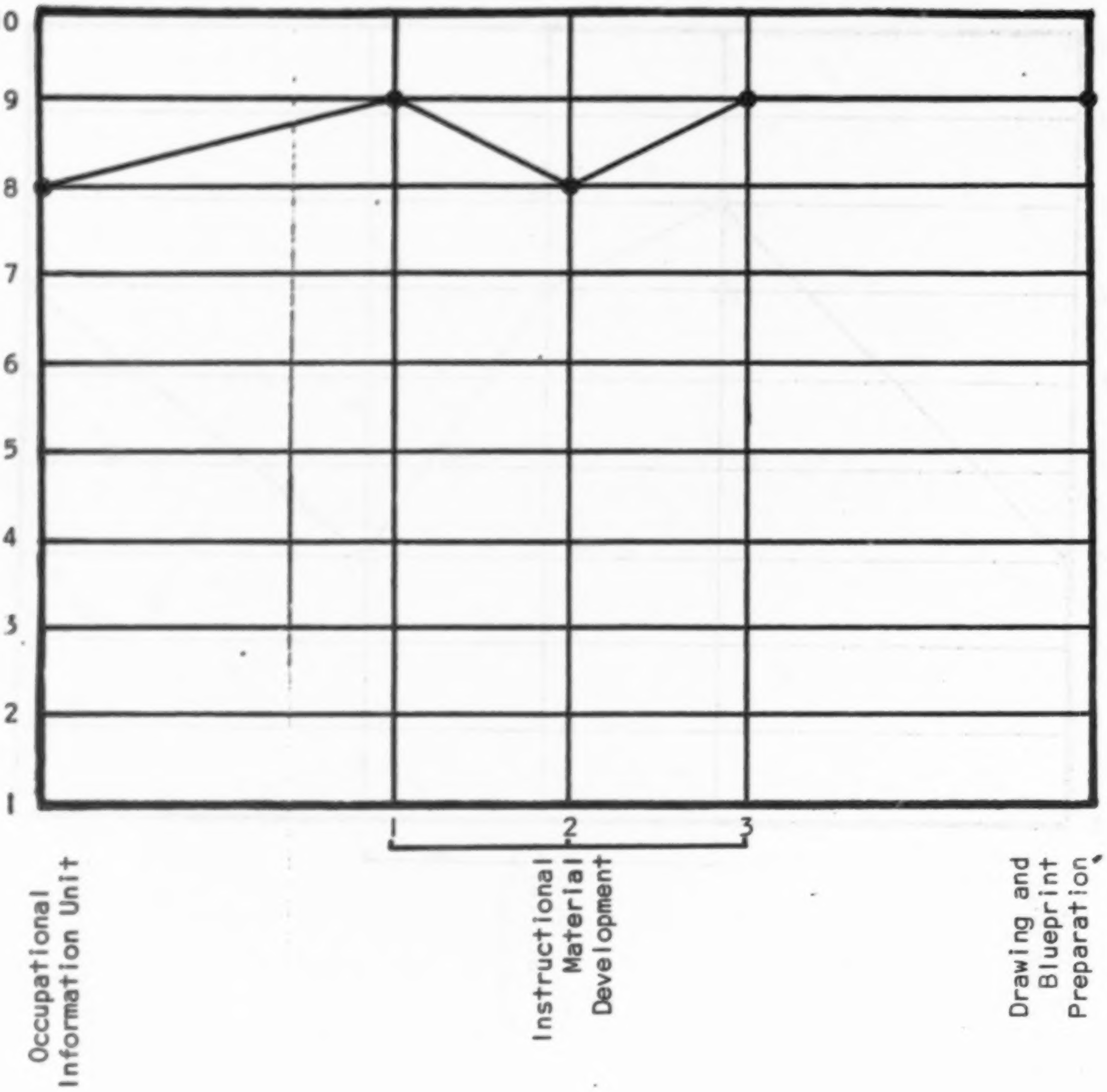

FIGURE 29.

EVALUATION PROFILE FOR TEACHER "B"
SUMMER WORKSHOP PROGRAM

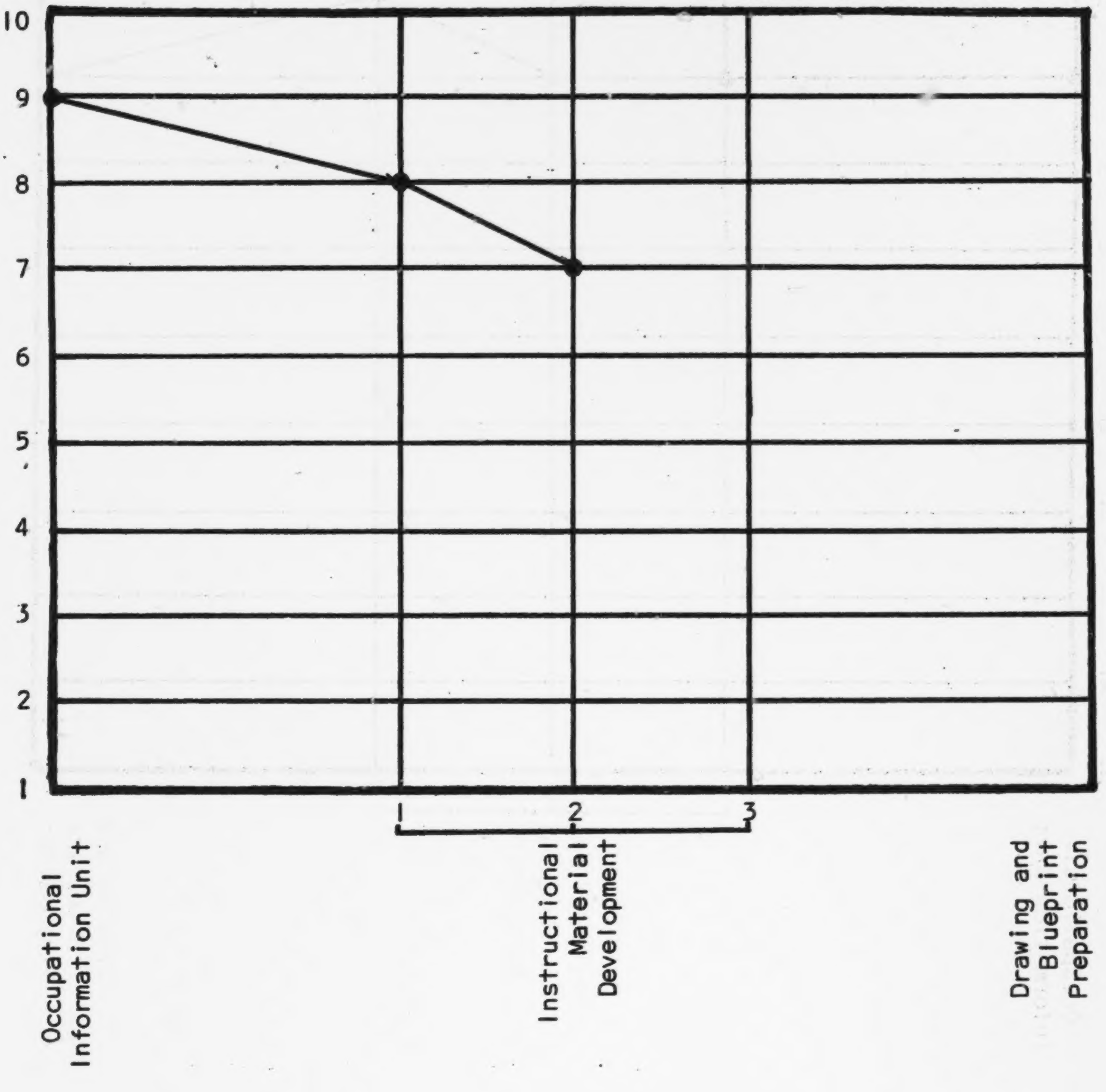

FIGURE 30.

EVALUATION PROFILE FOR TEACHER "C"
SUMMER WORKSHOP PROGRAM

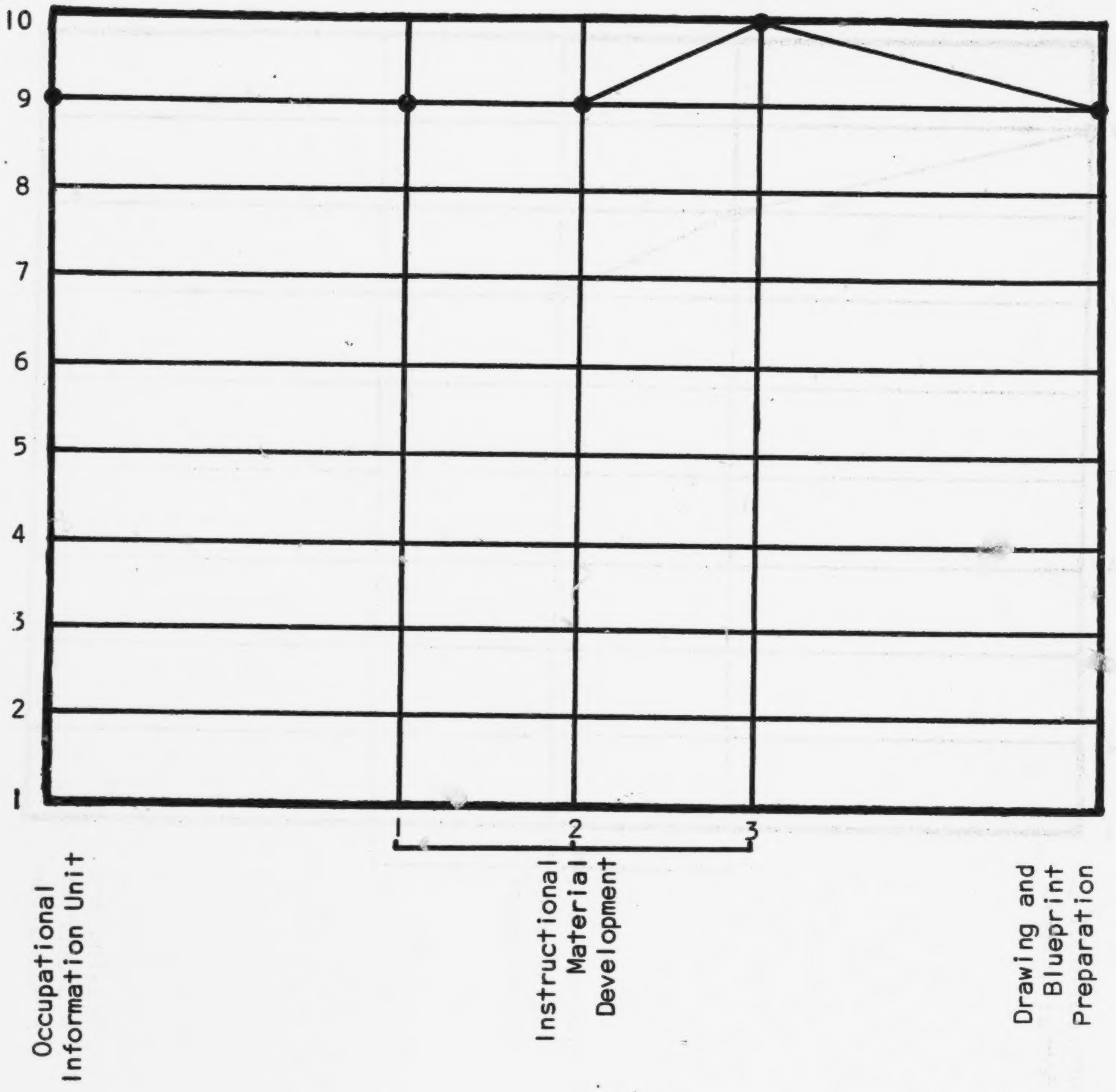

FIGURE 31.

EVALUATION PROFILE FOR TEACHER "D"
SUMMER WORKSHOP PROGRAM

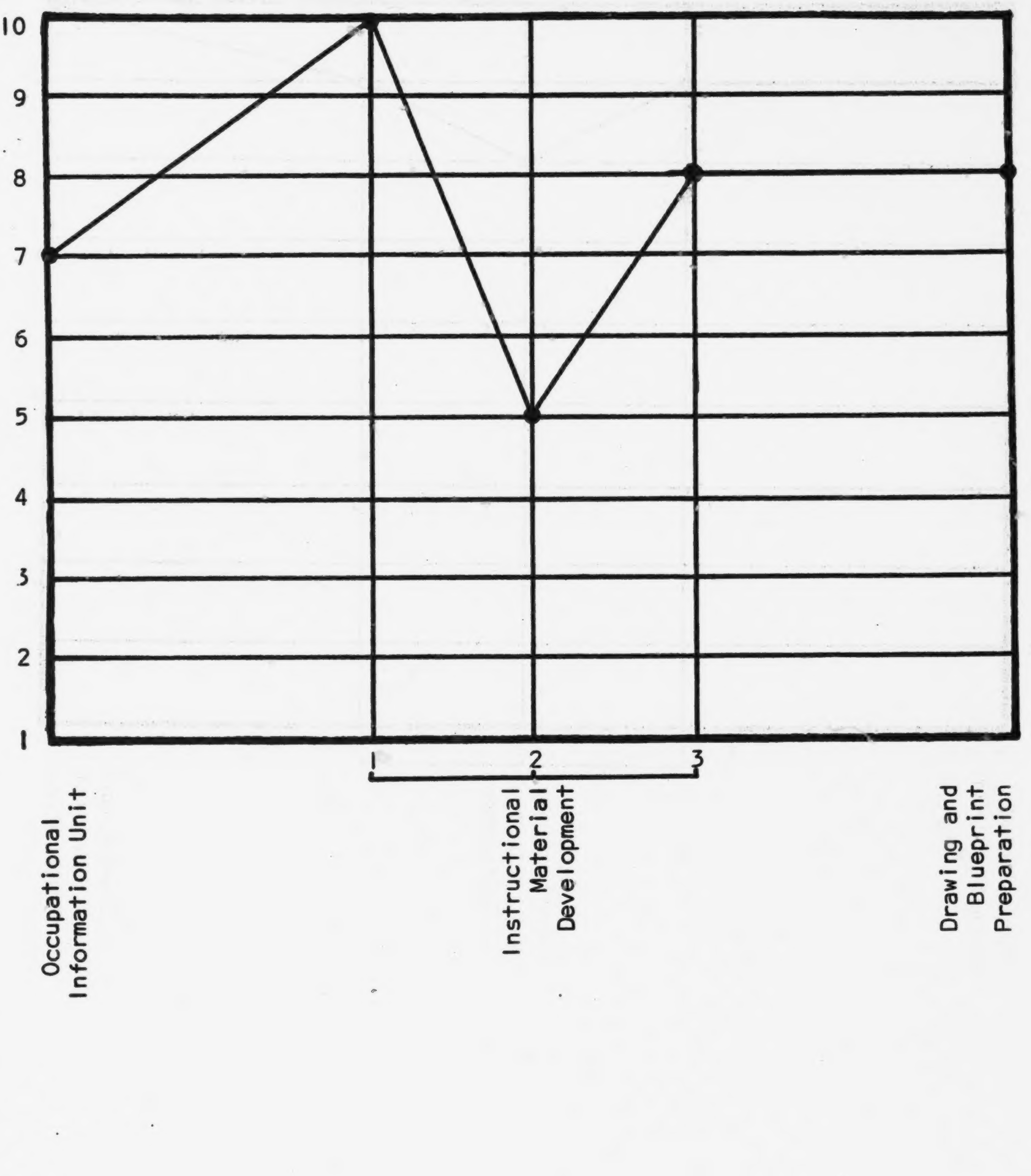

FIGURE 32.

EVALUATION PROFILE FOR TEACHER "E"
SUMMER WORKSHOP PROGRAM

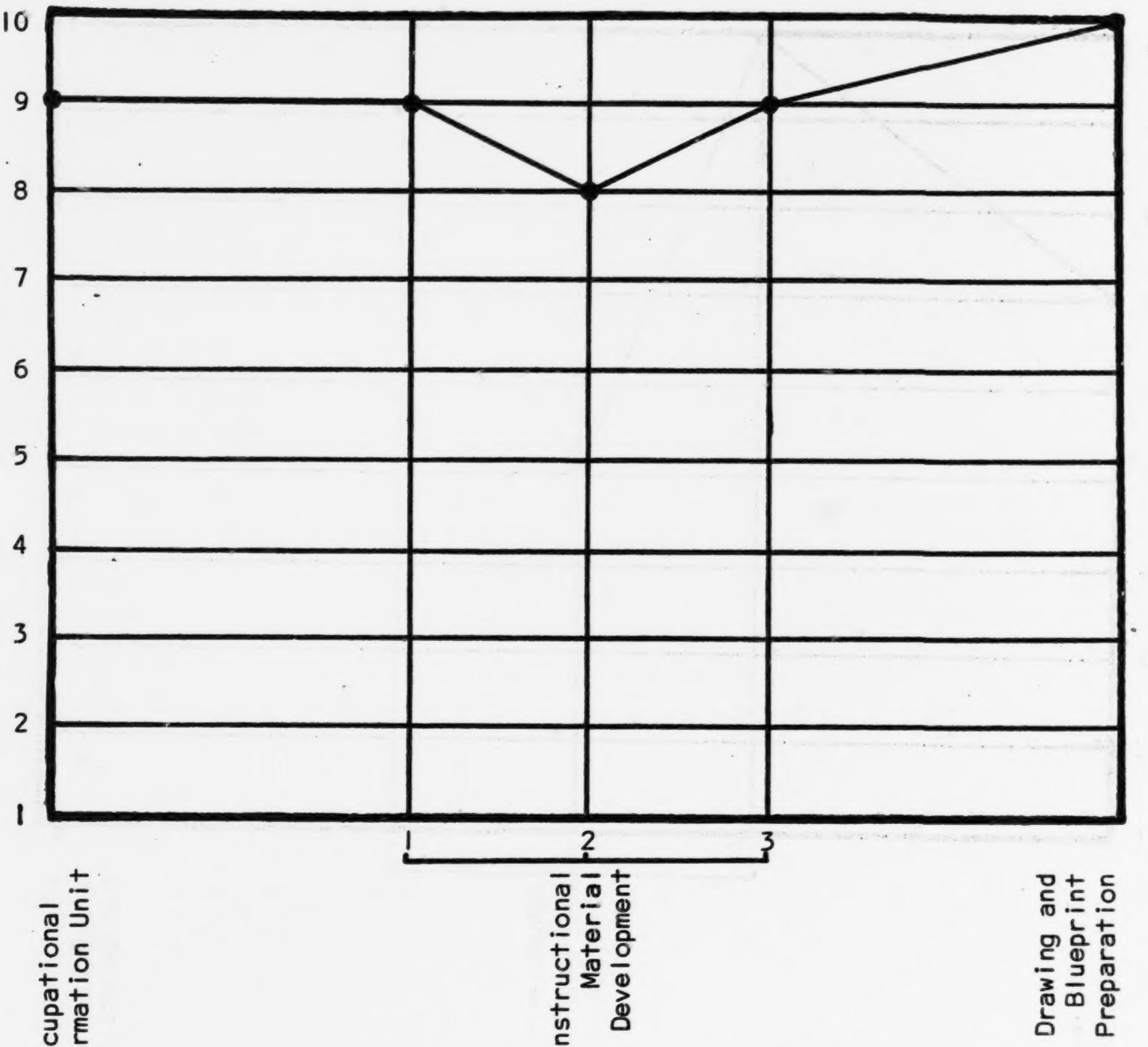

FIGURE 33.

EVALUATION PROFILE FOR TEACHER "F"
SUMMER WORKSHOP PROGRAM

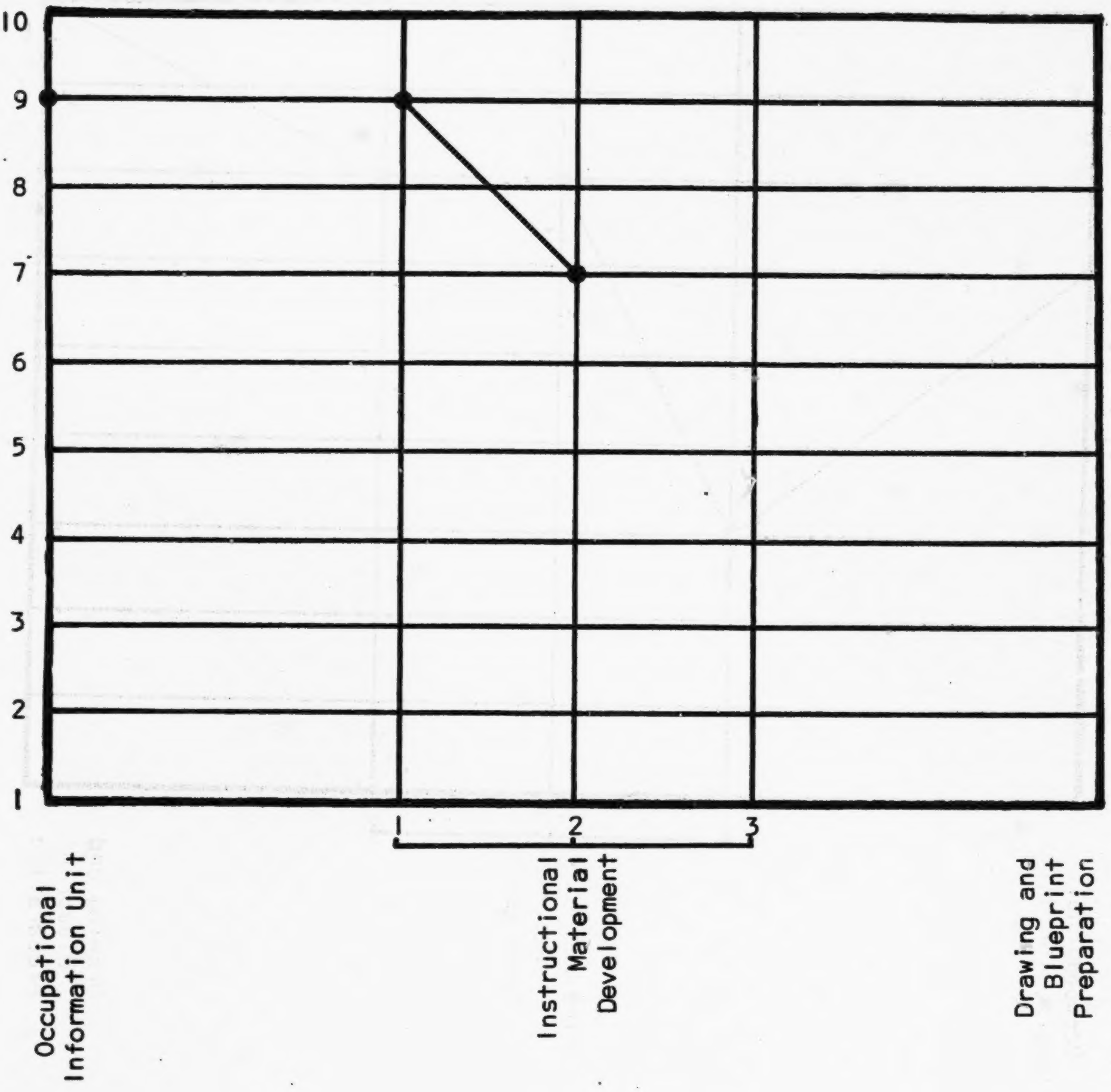

FIGURE 34.

EVALUATION PROFILE FOR TEACHER "G"
SUMMER WORKSHOP PROGRAM

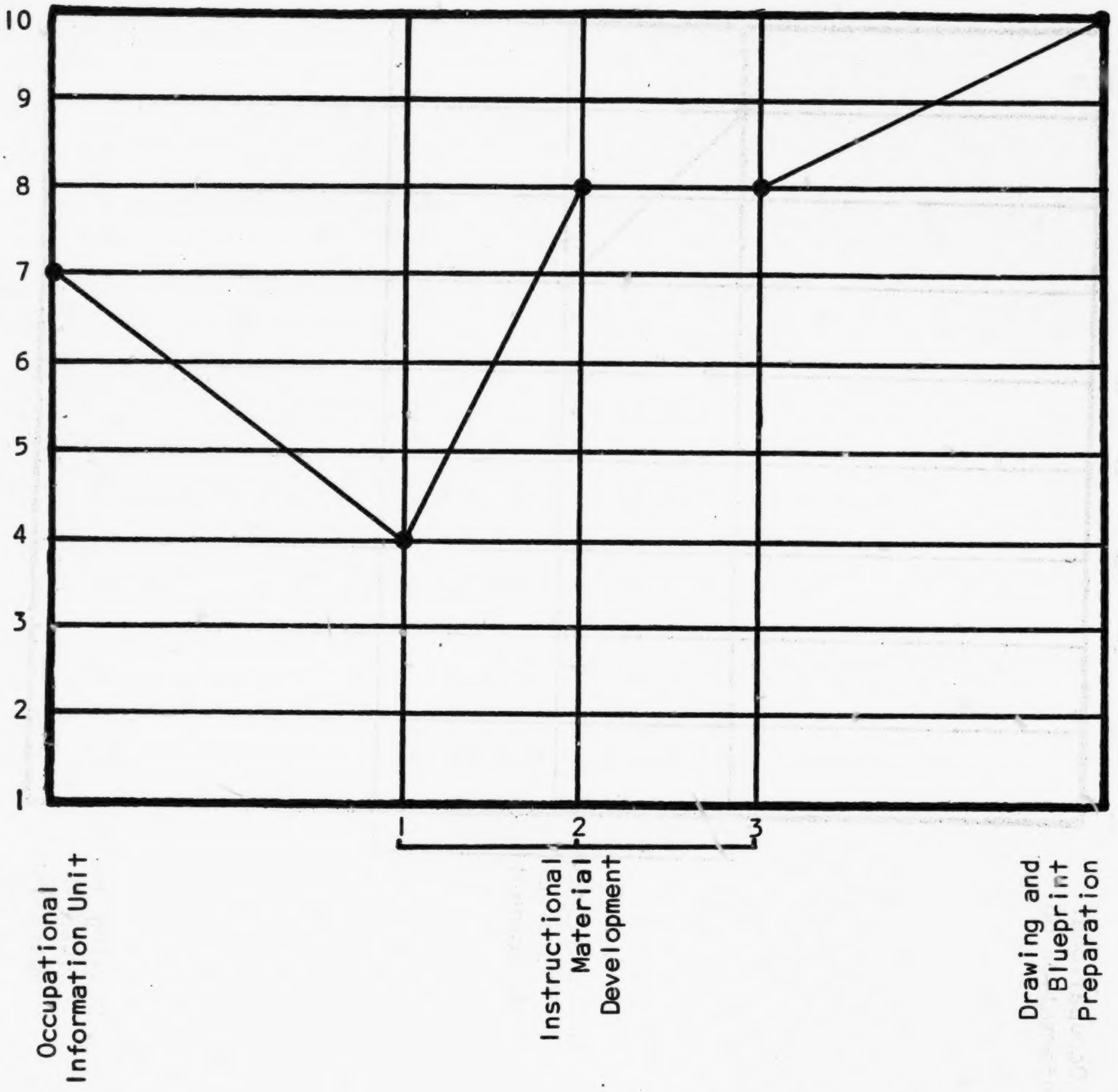

FIGURE 35.

EVALUATION PORFILE FOR TEACHER "H"
SUMMER WORKHOP PROGRAM

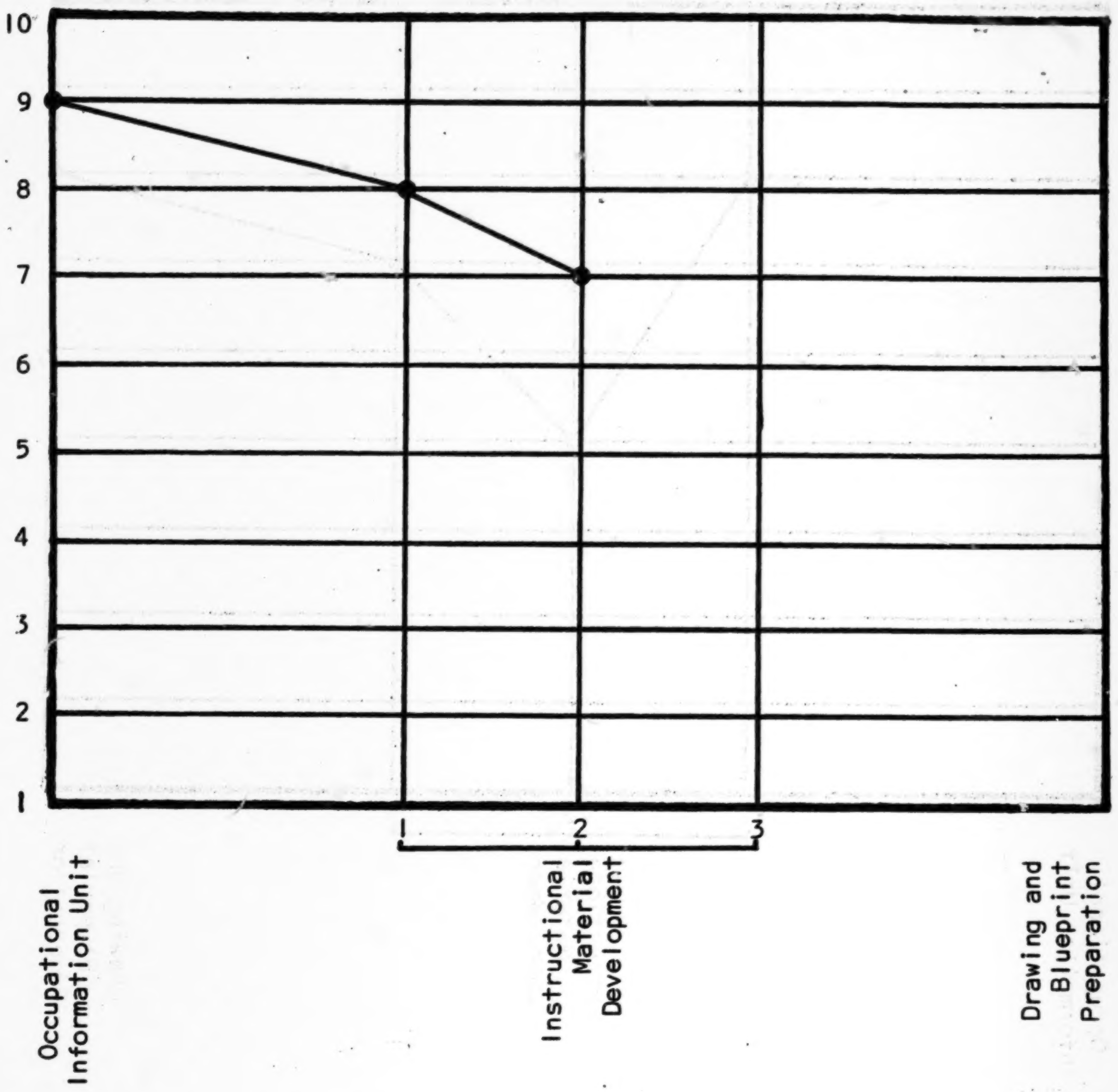

FIGURE 36.

EVALUATION PROFILE FOR TEACHER "I"
SUMMER WORKSHOP PROGRAM

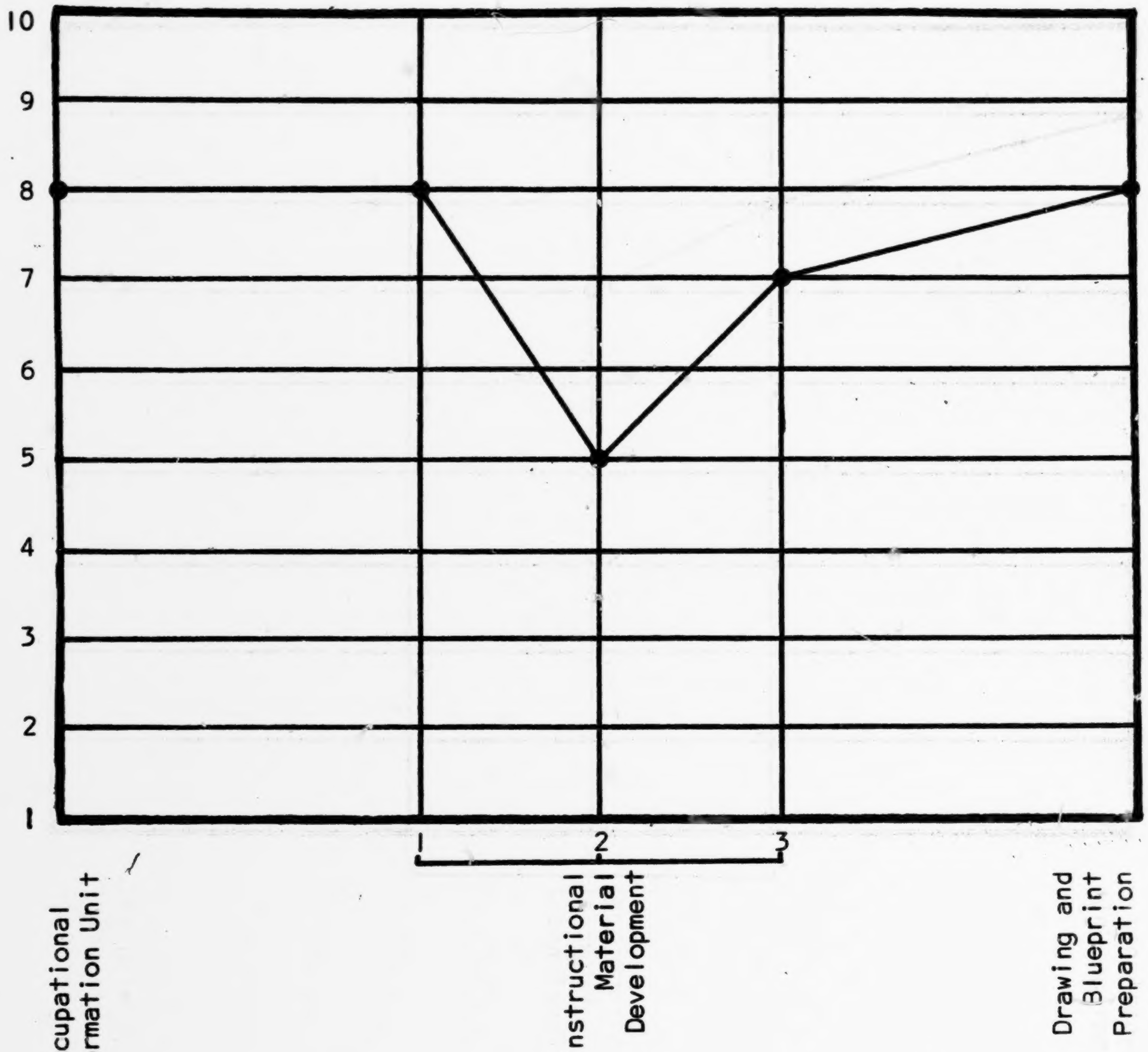

FIGURE 37.

EVALUATION PROFILE FOR TEACHER "J"
SUMMER WORKSHOP PROGRAM

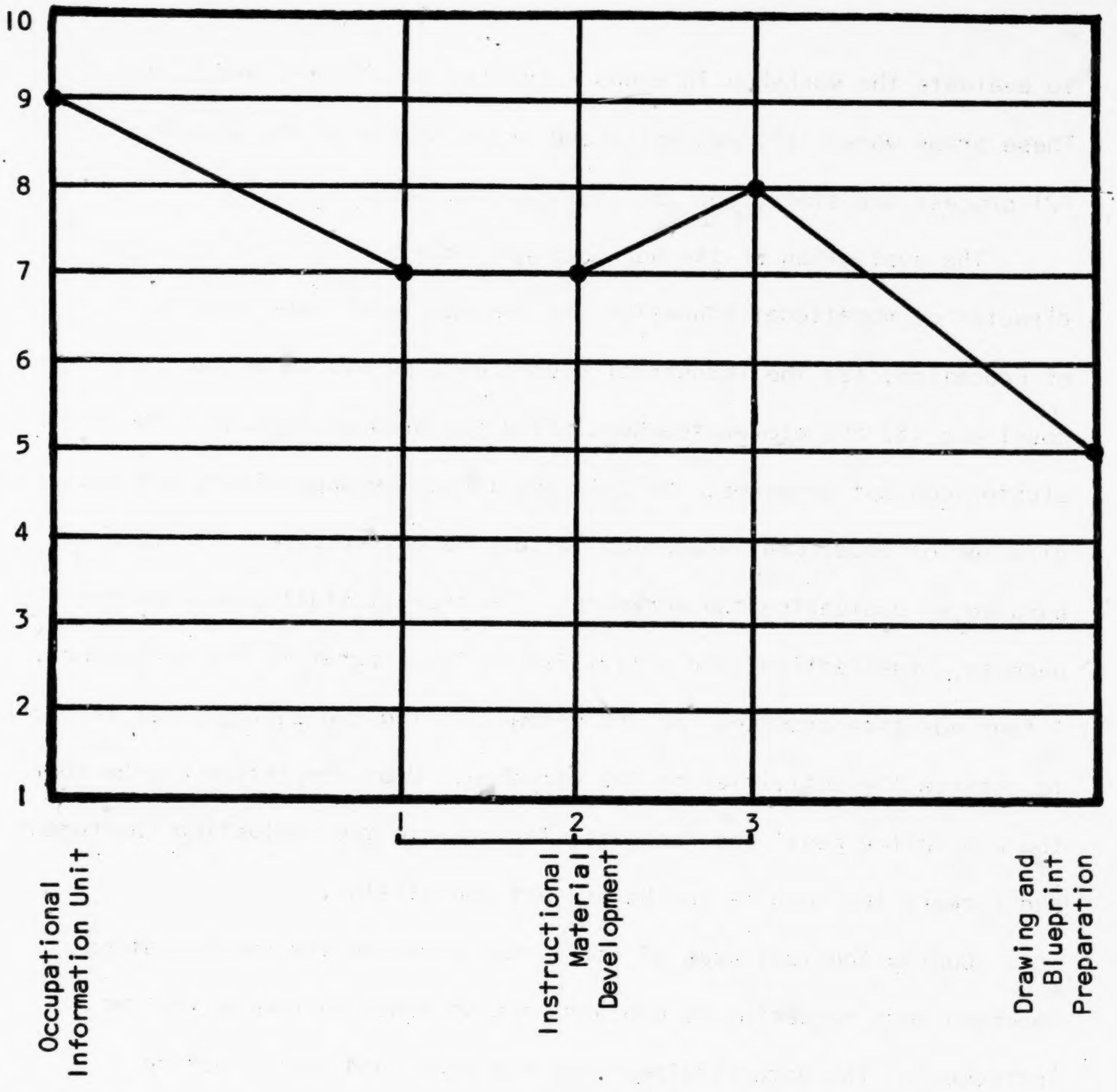

FIGURE 38.

EVALUATION PROFILE FOR TEACHER "K"
SUMMER WORKSHOP PROGRAM

to evaluate the workshop in areas suggested by O'Rourke and Burton.[10] These areas were: (1) mechanics and organization of the workshop; (2) process and staff; and (3) individual growth.

The evaluation of the workshop was made by: (1) the assistant director of vocational education for the Maryland State Department of Education; (2) the industrial education supervisors of the participating counties; (3) the eleven teachers being prepared to implement the pilot cluster concept programs. On July 26, 1967, the supervisors and assistant director of vocational education met at the University of Maryland for the purpose of evaluating the workshop. The project staff presented the purpose, organization, and activities of the program to the evaluators. A tour was then provided for the members of the evaluating panel in order to observe the activities of the workshop. Upon completion of the tour, the evaluation panel was requested to complete the evaluation instrument and forward the results to the project coordinator.

During the last week of the Summer workshop the participating teachers were requested to evaluate the workshop by completing the instrument. The data obtained from the panel and participating teachers were then analyzed in order to obtain an evaluation of the workshop.

The data were analyzed by assigning a numerical value to the responses for each question. The values were assigned in ascending order from one to four,with number four representing the optimum response. The values assigned to the responses were then totaled and a mean value was obtained for each question on the evaluation instrument. The mean values were then plotted on a graph to present the results in a visual form. The supervisors' evaluations are shown in Figure 39, while the teachers' responses are shown by cluster in Figures 40 through 42.

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[10] Mary A. O'Rourke and William H. Burton, Workshops for Teachers (New York: Appleton-Century-Crofts, Incorporated, 1967), p. 70.

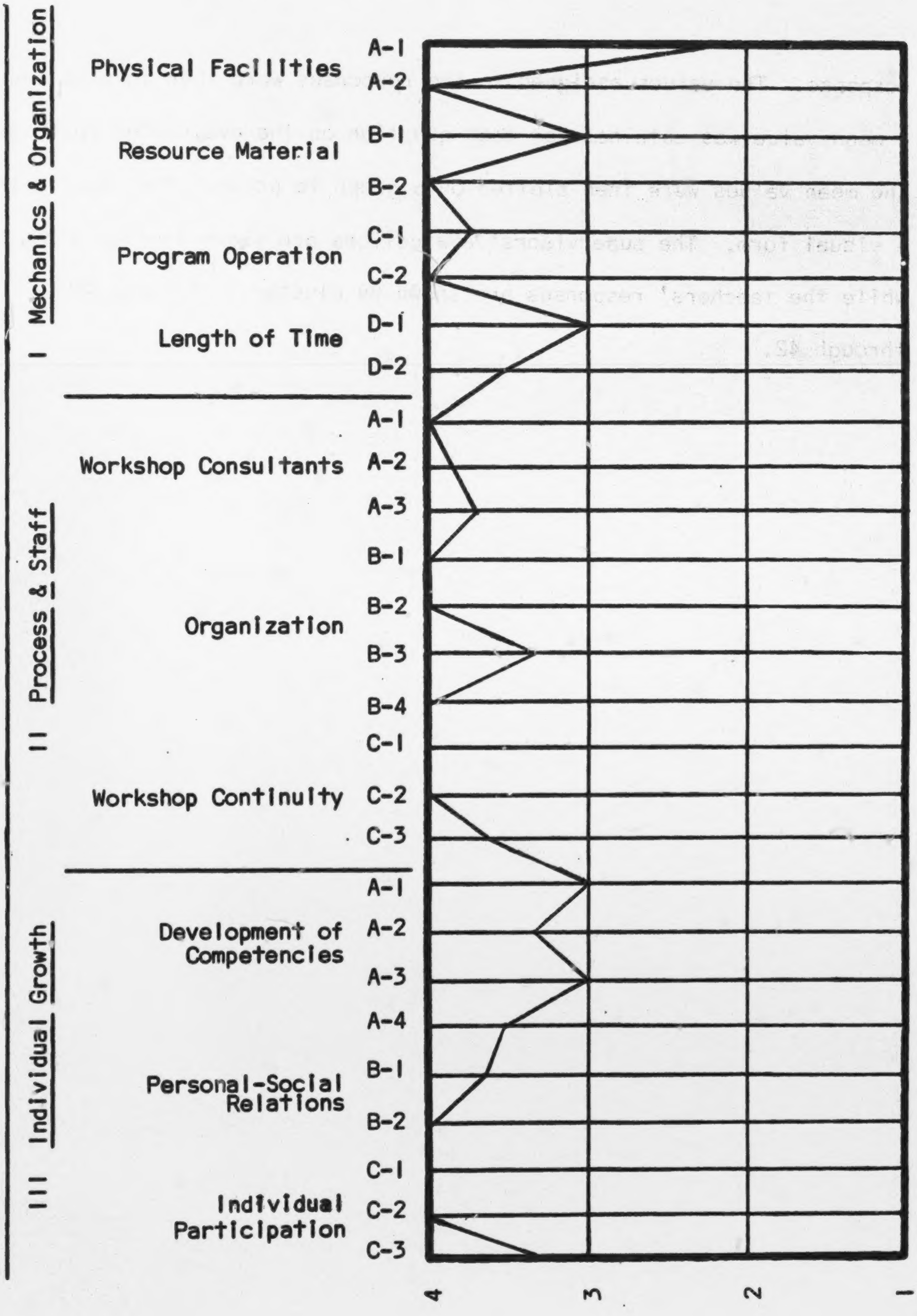

FIGURE 39. SUPERVISORS' EVALUATION OF THE SUMMER WORKSHOP PROGRAM

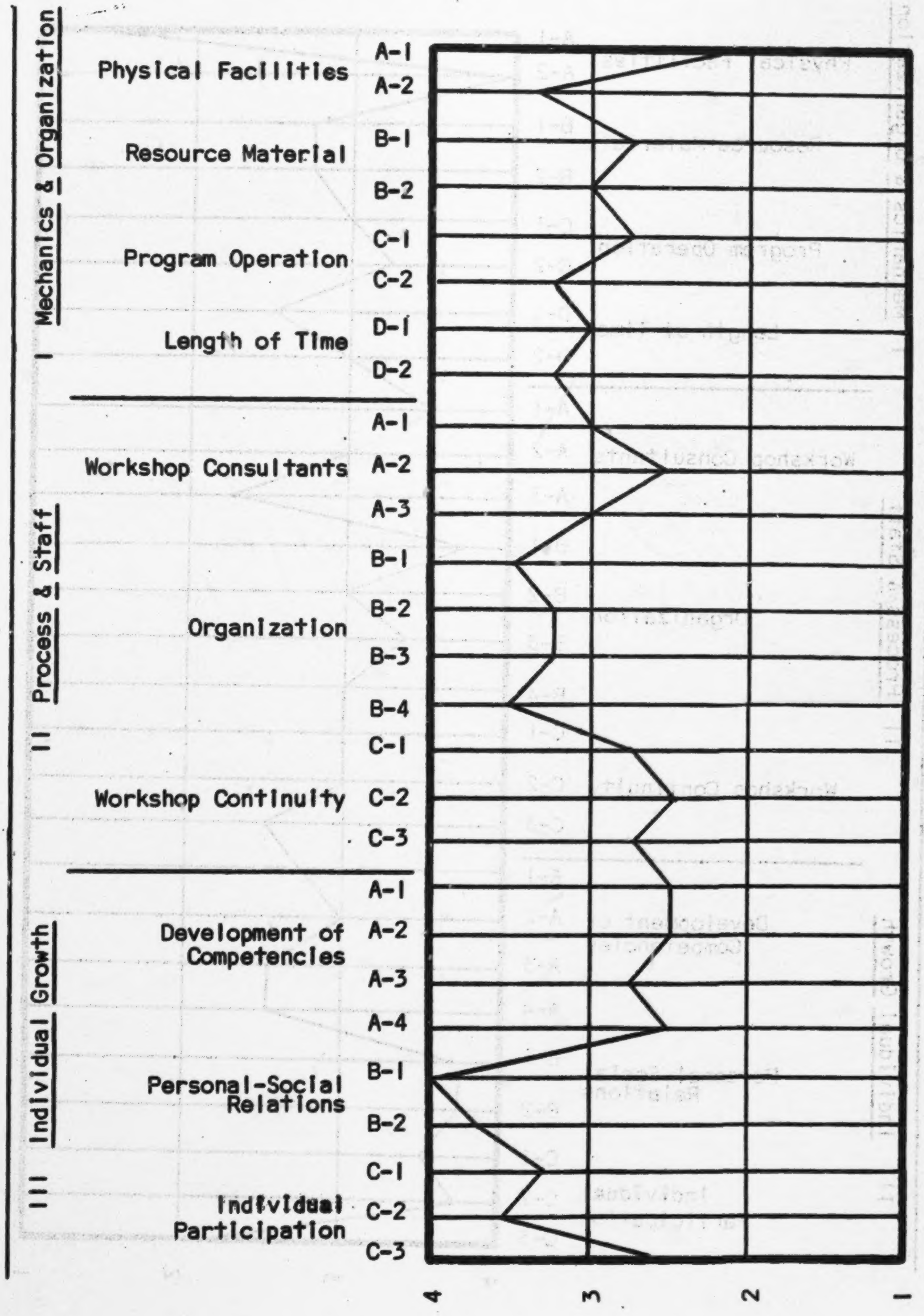

FIGURE 40. CONSTRUCTION CLUSTER TEACHERS' EVALUATION OF THE SUMMER WORKSHOP PROGRAM

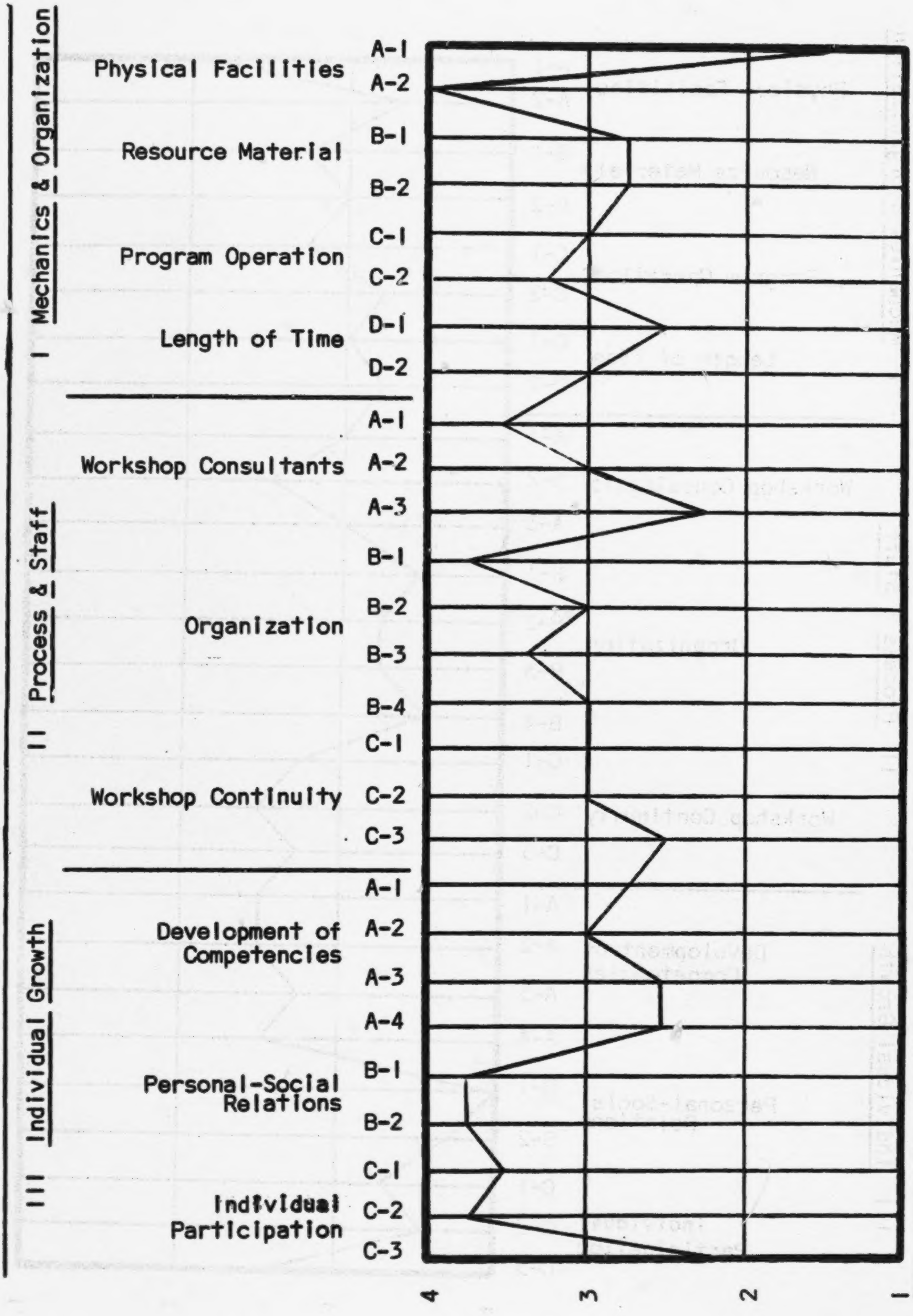

FIGURE 41. METAL FORMING AND FABRICATION CLUSTER TEACHERS' EVALUATION OF THE SUMMER WORKSHOP PROGRAM

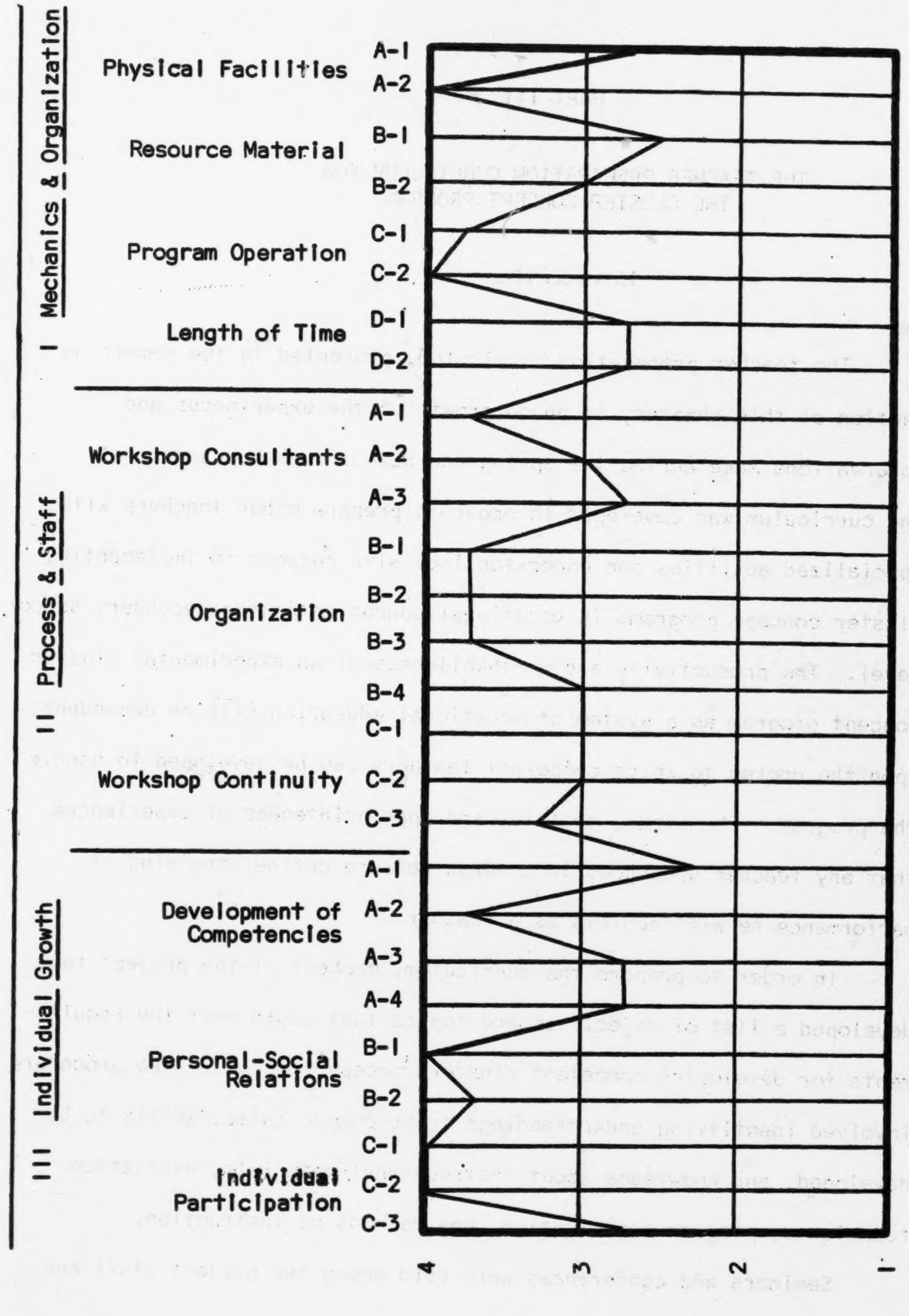

FIGURE 42. ELECTRO-MECHANICAL INSTALLATION AND REPAIR CLUSTER TEACHERS' EVALUATION OF THE SUMMER WORKSHOP PROGRAM

PART III

THE TEACHER PREPARATION CURRICULUM FOR THE CLUSTER CONCEPT PROGRAM

Introduction

The teacher preparation curriculum, presented in the remaining section of this chapter, is an outgrowth of the experiences and observations made during the Spring and Summer workshop sessions. The curriculum was developed in order to prepare other teachers with specialized abilities and understandings with respect to implementing cluster concept programs in vocational education at the secondary school level. The productivity and worthwhileness of an experimental cluster concept program as a system of vocational education will be dependent upon the degree to which competent teachers can be developed to handle the program. The kinds, quality, and appropriateness of experiences that any teacher undergoes in a large measure define the kind of performance he will achieve as a teacher.

In order to prepare the curriculum, members of the project team developed a list of objectives and topics that would meet the requirements for developing competent cluster concept teachers. The procedure involved identifying understandings to be communicated, skills to be developed, and knowledge about instructional materials, evaluation techniques, program organization, and methods of instruction.

Seminars and conferences were held among the project staff and members of the industrial education department in order to develop the curriculum. The result of this activity was the development of a teacher preparation curriculum shown on the following pages.

Teacher Preparation Curriculum

Description. The curriculum is concnerned with preparing teachers for the occupational clusters of: (1) construction; (2) metal forming and fabrication; and (3) electro-mechanical installation and repair. The primary purpose of the curriculum is to develop teachers capable of implementing cluster concept programs. Emphasis should be placed on developing attitudes, understandings, and concepts necessary for teaching a cluster concept program. Instruction should be provided for the development of curriculum materials, organizational procedures, instructional aids, and the professional and technical competencies necessary for implementing cluster concept programs in vocational education at the secondary school level.

The persons receiving the instruction should have several years of teaching experience. The teachers should display competencies in: (1) understanding students; (2) the learning process; (3) the application and utilization of selected teaching methods; and (4) the selection and use of instructional materials. The curriculum would provide for further development of experienced teachers with respect to the implementation of a cluster concept program in vocational education at the secondary school level.

Need. The purpose of the curriculum is to provide experienced industrial teachers with a background regarding the philosophy, organizational procedures, instructional materials, vocational skills, and educational experiences necessary for maximum effectiveness in teaching a cluster concept program. Specific needs are as follows:

1. Cluster concept teachers will need a broad range of vocational skills and competencies necessary for teaching the various areas of their occupational cluster.
2. The teachers will need a broad range of understanding and capability in a number of instructional methods.
3. The teachers will need a broad range and understanding of a number of instructional materials.
4. The teachers will need an understanding of the program and its potential in vocational education.
5. The teachers will need a broader understanding of the areas in the program and curriculum evaluation.

Objectives. The teacher preparation curriculum for the cluster concept program includes the following objectives:

1. Developing an understanding of the cluster concept as a program in vocational education on the secondary school level.
2. Developing the required skills and knowledge (math, science, blueprint reading, safety procedures, etc.) required for teaching the identified occupational clusters.
3. Developing information about a range of instructional methods and the ability to use these methods in teaching the content identified in the cluster concept program.
4. Developing knowledge about the types and proper use of instructional materials for the cluster concept program.
5. Developing knowledge about a range of evaluation methods and proper utilization of these methods.

Procedures. The teacher preparation curriculum for the cluster concept program should be composed of four separate courses listed below:

1. Professional competency development for cluster concept programs.

2. Organization and administration of cluster concept programs.
3. Technical competency development for cluster concept programs.
4. Instructional materials development for cluster concept programs.

It is recommended that the courses dealing with professional competency development, organization and administration of cluster concept programs, and instructional materials development be conducted on a seminar basis. These courses should involve active participation by the teacher-trainees and the instructor. Special consultants and guest speakers representing areas of instructional technology, administration, curriculum development, evaluation, industry, and labor should be utilized wherever possible in order to familiarize the teachers with current trends and practices.

Representatives from community agencies such as the employment services and local labor unions should be utilized on panels, and in discussion groups to provide the teacher-trainees with occupational information and employment opportunities within their occupational cluster. Technical representatives should conduct workshops or training sessions, displaying the latest audio-visual equipment and instructional materials. Emphasis should be placed on their utilization in a cluster concept program.

Seminars should be held between the teacher-trainees, the instructor and educators in the field of curriculum development and pupil evaluation. These seminars should provide the teacher-trainees with various evaluation techniques to be utilized in evaluating students in a cluster concept program.

In order to develop the technical competencies of the teacher-trainees, local businesses and industries may be utilized to provide on-the-job experience. These experiences should be organized to provide the skills and knowledge required for the occupations in a cluster.

Course outlines. The course outlines for the teacher preparation curriculum are presented on the following pages. Each course is divided into units. The purpose and time required for each unit are provided to aid the instructor in organizing the course. A list of topics are provided in the course outlines and should be covered by completing the items listed under activities and procedures. The resource list contains information needed by the instructor and teacher-trainees to complete the course.

I. PROFESSIONAL COMPETENCY DEVELOPMENT FOR CLUSTER CONCEPT PROGRAMS

Unit I: Cluster Concept Orientation

Purpose: The cluster concept orientation unit is intended to establish an understanding of the cluster concept as a program in vocational education at the secondary school level.

Time: Three hours.

Topics:

1. Rationale for the cluster concept in vocational education.
    A. To provide students with a greater degree of mobility on a geographical basis.
    B. To provide students with mobility for jobs within an industry or occupation.
    C. To provide students with mobility for jobs within an industry or occupation.
    D. To provide students with a broader base of training, thus permitting a wider range of job entry opportunities.
    E. To provide students with skills that are common to several occupations within a specific cluster.
2. Definition of a cluster concept program.
    A. The grouping of related occupations into a "cluster" or family of occupations.
    B. The development of skills and knowledges needed for job entry into a cluster of occupations.
    C. The identification of the skills and knowledges that are common to a number of occupations within a specific cluster.
3. Need for a cluster concept program.
    A. To provide students with a greater degree of mobility on a geographical basis.

B. To provide students who will be able to adapt to technological changes.

C. To provide students with an understanding of several occupational areas, permitting a wider range of occupational choice patterns.

D. To provide students with skills that are transferable to various occupations within an industry or plant.

4. Characteristics of the cluster concept as compared to other programs in vocational education.

A. The development of skills and knowledges related to several occupations versus the development of skills and knowledges for a specific occupation.

B. Job entry training versus in-depth skill training.

C. Identification of the common tasks and skills needed for entry into related occupations.

Procedures and Activities: The orientation program should be conducted using the following procedures:

1. Instructor: lecturing on the philosophy, need, characteristics and rationale for the cluster concept program.
2. Instructor: organizing a panel representing industry, labor, management, and vocational education to discuss the need for a cluster program.
3. Class: participating in group discussion contrasting the cluster concept approach with "traditional" vocational education.
4. Class: discussing the opportunities available to a person with training in a cluster program.
5. Teacher-trainee: interviewing representatives from labor, management, and education to obtain viewpoints on a cluster concept program.

Resources:

Slide Presentation of the Cluster Concept Project. Available: Industrial Education Department, University of Maryland.

Overlay Presentation of the Cluster Concept Project. Available: Industrial Education Department, University of Maryland.

Video-tape Recording of the Research Procedures Utilized in the Cluster Concept Project.
Available: Educational Technology Department, University of Maryland.

Final Report (four volumes), "An Investigation and Development of the Cluster Concept as a Program in Vocational Education at the Secondary School Level."
Contract Number OE 685-023.
Available: U.S. Department of Health, Education, and Welfare, Office of Education, Washington, D.C.

Altman, James W. Research on General Vocational Capabilities (Skills and Knowledges). Pittsburgh, Pennsylvania: American Institutes for Research, 1966.

Bancroft, Gertrude and Garfinkle, Stuart. "Job Mobility in 1961," Special Labor Force Report, No. 35. Washington: U.S. Department of Labor, Bureau of Labor Statistics, 1963.

Bates, Charles D. "North Carolina's State Wide Program - Introducing Students to Industry." Industrial Arts and Vocational Education, 25:58, April, 1966.

Clague, Evan and Greenberg, Leo. "Technological Change and Employment." Monthly Labor Review, 85:741-746, 1962.

Turnquist, Carl H. "Galaxy Approach to Education for the World of Work." Industrial Arts and Vocational Education, 25:25, November, 1965.

U.S. Department of Health, Education and Welfare, Office of Education. Education for a Changing World of Work. Washington: Government Printing Office, 1963.

B. The instructional capability of being implemented in a secondary school program.

C. Opportunity for job entry upon graduation from high school.

D. Numerous skills and knowledge providing an opportunity for the identification of commonalities with other occupations.

E. Opportunity for advancement through further schooling, apprentice programs, or on-the-job training.

4. Development of a List of Tasks for each Occupational Cluster.

   A. Review of the literature on task analysis.

   B. Identification of tasks for each occupational cluster.

   C. Verification of tasks with representatives from each occupation.

5. Identification of Job Entry Tasks in each Occupational Cluster.

   A. Development of a task identification inventory.

   B. Conference with individuals representing the selected occupations in order to determine job entry tasks.

Procedures and Activities:

1. Teacher trainee: reviewing research studies in vocational education related to the cluster concept.

2. Instructor: lecturing on the techniques used in determining occupational clusters.

3. Class: identifying occupations within a specific cluster which fit the specified criteria.

4. Class: analyzing several tasks in an occupational cluster.

5. Teacher trainee: interviewing representatives from local business, industries, and labor organizations to verify the tasks identified in an occupational cluster as job entry skills.

References:

Video-Tape Recording of the Research Procedures Utilized
in the Cluster Concept Project.
Available: Educational Technology Department, University
of Maryland.

Unit II: Research Procedures Used in Determining Content for Occupational Clusters

Purpose: The purpose of this unit is to explain the research techniques used in determining the content for the occupational clusters.

Time: Eighteen hours.

Topics:

1. Review of Related Literature.

    A. Review of research in the areas of psychology, education, and military training involving similar educational programs.

    B. Review of research pertaining to occupations, occupational structure, trends, and requirements.

    C. Review of literature involving job analysis techniques and occupational classification systems.

    D. Review of literature published by private and public agencies involved in employment placement, recruitment, and training.

2. Criteria used in Selecting Occupational Clusters.

    The occupational cluster should:

    A. Be in the area of vocational industrial education.

    B. Include occupations that are related on the basis of similar processes, materials, and products.

    C. Be broad enough to include occupations with a wide variety of skills and knowledge.

    D. Involve occupations that require not more than a high school education and/or two years beyond high school.

    E. Provide the opportunity for mobility on a geographical and occupational basis.

3. Selection of Specific Occupations within the Clusters.

    The occupations selected should have:

    A. A favorable employment outlook.

Unit III: Task Analysis Techniques

Purpose: The purpose of the task analysis unit is to acquaint the teacher-trainees with the procedures and techniques used in analyzing the identified job entry tasks and the areas of human requirement (skills, mathematics, measurement, science, communication, and information) needed to successfully perform the task.

Time: Eighteen hours.

Topics:

1. Identification of the Areas of Human Requirement.

   The areas of human requirement that were identified as common to most occupations are:

   A. Communication.
   B. Measurement.
   C. Skills.
   D. Mathematics.
   E. Science.
   F. Information.

2. Analysis of the task into the Areas of Human Requirement.

   A. Review of the literature on task analysis.
   B. Review vocational publications to identify the performance necessary to complete each task.
   C. Catagorizing the necessary performance into the specific areas of human requirement.

3. Identification of Common Areas of Human Requirement among Selected Occupations.

   The common areas of human requirement were classified according to the following criteria:

A. Common to all occupations withing the cluster.

B. Common within one occupation.

4. Validation of the Task Analysis.

A. Validation of the task analysis with local craftsmen.

B. Validation of the task analysis with local and national labor unions.

C. Validation of the task analysis with local businessmen.

Procedures and Activities:

1. Instructor: lecturing on the techniques used in task analysis.
2. Instructor: lecturing on the methods used to identify commonalities.
3. Teacher trainee: analyzing several tasks by identifying only those items necessary to know in order to perform the task.
4. Teacher trainee: catagorizing their results into the areas of human requirement.
5. Class: identifying common areas of human requirement.
6. Teacher trainee: interviewing representatives from business and industry, labor organizations and craftsmen in order to verify their analysis.

Resources:

Gagne, Robert M. Conditions of Learning. New York: Henry Holt and Company. 1966.

Marsh, Joseph E., Joseph M. Madden, and Raymond E. Crhistal. Job Analysis in the United States Air Force. Technical Report WADD-TR-61-113. Lackland Air Force Base: Texas. Personnel Laboratory, Wright Air Development Division. February, 1961.

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Available: U.S. Department of Health, Education, and Welfare, Office of Education, Washington, D.C.

Unit IV: Preparation of Objectives in Behavioral Terms

Purpose: This unit is intended to familiarize the teacher-trainees with the processes of writing objectives in behavioral terms.

Time: Six hours.

Topics:

1. The Status of Writing Objectives in Behavioral Terms.
   - A. The use of behavioral objectives in training programs conducted by the military services.
   - B. The use of behavioral objectives in industrial training programs.
   - C. The use of behavioral objectives in educational institutions.
2. The Purpose of Writing Objectives in Behavioral Terms.

   Objectives should be written in order to:

   - A. Identify and name the over-all student behavior.
   - B. Define the important conditions under which behavior occurs.
   - C. Define the restrictions and/or limitations under which the behavior occurs.
   - D. Define the terminal behavior or criterion of acceptable behavior.
3. Definition of an Objective.

   A behavioral objective should:

   - A. Describe definite pupil behavior.
   - B. Describe the outcomes of the learning experiences.

C. Use a noun to describe the object acted upon.

D. Describe the results of the action.

E. Use modifiers to identify objects and clarify results.

F. State the degree of accuracy to which the action is performed.

5. Experiences in Writing Objectives in Behavioral Terms.

A. Writing task statements in behavioral terms.

B. Writing communication statements in behavioral terms.

C. Writing measurement statements in behavioral terms.

D. Writing skill statements in behavioral terms.

E. Writing mathematical statements in behavioral terms.

F. Writing science statements in behavioral terms.

G. Writing information statements in behavioral terms.

Procedures and Activities:

1. Class: discussing the literature on the use of behavioral objectives.

2. Teacher trainee: interviewing personnel conducting training programs to determine the value of stating objectives in behavioral terms.

3. Teacher-trainee: preparing written reports contrasting the evaluation techniques needed when objectives are written behaviorally and conventionally.

4. Class: identifying verbs which can be used in preparing behavioral objectives for their specific occupational cluster.

5. Teacher-trainee: preparing task statements for the occupational cluster that are written in behavioral terms.

6. Teacher-trainee: preparing behavioral statements for all the areas of human requirement.

Resources:

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II. ORGANIZATION AND ADMINISTRATION OF CLUSTER CONCEPT PROGRAMS

Unit I: Program Development

Purpose: This unit is designed to guide the student in the use of cluster concept course outline material when developing a program of studies.

Time: Twenty-four hours.

Topics:

I. Process of Program Development.

  A. Community involvement in program development

    (1) industry-education advisory committee

    (2) PTA

    (3) chamber of commerce

    (4) local tradesmen

  B. School involvement in program development

    (1) initial planning at administrative and board of education level

    (2) administrative and guidance action in regard to schedule rearrangement

    (3) staff participation through faculty meetings and committee assignments

  C. Teacher participation in program development

    (1) becoming acquainted with community resources in area of interest

    (2) arranging tasks in course outline in a practical sequence for teaching

    (3) Integrating areas of human requirement in each task into a logical pattern for teaching

    (4) becoming acquainted with and practicing use of new educational media

2. Factors Affecting Program Development
   - A. Nature of student to be served
     - (1) junior and senior high school students
     - (2) general student, uncommitted as far as future plans
   - B. Objectives and purposes of the school
     - (1) college entrance
     - (2) community center
     - (3) preparation for life
   - C. Social and cultural values of the community
     - (1) the light in which the school system is viewed
     - (2) occupations which are considered respectable
     - (3) desires and expectations for minority groups
   - D. Attitudes and values of employees in the community
     - (1) qualities desired in employees
     - (2) cooperation with the school in furnishing resource people, field trips
     - (3) concern for fundamentals
     - (4) regard for dignity of man
3. Items for Consideration in the Development of the Program
   - A. Selection of students
     - (1) informational literature for students and parents
     - (2) meet with administrative and guidance personnel to discuss the program and scheduling problems
   - B. Allocation of time
     - (1) fitting program into the total school schedule
     - (2) assuring a block of time of at least a double period

C. Organization of the laboratory

  (1) work stations for each occupation

  (2) space for unifying projects

  (3) provision for audio-visual equipment, storage and use

  (4) sources of specialized equipment for each occupation

D. Instructional sequence of the program

  (1) sequence if tasks taught in order, one occupation at a time

  (2) sequence if tasks taught in order needed for building a unifying project

  (3) sequence if level I and level II tasks are separated

  (4) sequence if level I and level II tasks are integrated

E. Use of resource people

  (1) aid instructor in presenting technical material

  (2) supplement program in such areas as employment, union affairs

Procedures and Activities:

1. Teacher: lecturing on the purpose of, and community involvement in, program development.

2. Teacher: conducting a seminar on school involvement and teacher participation in program development.

3. Student: conducting meetings to orient uninformed people concerning the cluster concept.

4. Student: acting as a group leader in program development sessions.

5. Teacher: conducting a panel discussion concerned with the nature of the student to be served.

6. Student: interviewing students who wish to become students in the cluster concept.

7. Teacher: discussing the objectives and purposes of the school at a meeting sponsored by the school administration.

8. Teacher: conducting a panel discussion of the social and cultural values of the community in which community leaders would participate.

9. Student: interviewing employers in the community to ascertain their attitudes concerning the cluster concept.

10. Class: visiting schools having active cluster concept programs.

11. Class: meeting with administrative and guidance personnel to discuss the purpose and objectives of the cluster concept programs, the type of student the course was designed for, and the procedure for selection of students.

12. Teacher: lecturing on the allocation of time for the program.

13. Teacher: conducting a panel discussion on organization of the laboratory.

14. Student: developing plans for the physical arrangement of a shop for the cluster concept.

15. Student: developing a library of materials for use in ordinary specialized equipment for use with the cluster concept .

16. Teacher: lecturing on the areas of human requirement in each instructional plan.

17. Teacher: conducting a seminar on the instructional sequence of the program.

18. Student: developing plans for unifying project.

19. Class: arranging tasks in a logical sequence for use with the cluster concept program.

20. Student: designing record and report forms for use with the cluster concept program.

21. Student: making a list of resource people who would be available during the school year to supplement the cluster concept curriculum.

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Unit II: Methods of Teaching

Purpose: This unit is designed to acquaint the prospective teacher of the cluster concept with a number of instructional procedures appropriate to a wide variety of student ability as well as a wide range of educational objectives.

Time: Twelve hours.

Topics:

I. Methods of Individual Instruction.

A. Demonstration lessons

Definition:

(1) consist of four parts: preparation, presentation, application, evaluation

(2) involve the instructor in "show and tell" dialogue with student

(3) are used to teach manipulative activities

(4) allow for student practice in the presence of the instructor

Applications of the Individual Demonstration to Cluster Concept Material:

(1) intricate operations

(2) reinforcement of previously taught material

(3) helping learners

(4) teaching operations not applicable to the entire class

B. Job Sheet

Definition:

(1) contains written instructions, illustrations, list of necessary tools and materials

(2) provides a student with "know-how" to do a job

(3) teaches a student the operations necessary to perform the job.

Applications of the Job Sheet to Cluster Concept Material:

(1) a means of assigning work

(2) permits varying levels of work to be performed at one time

(3) permits work in more than one occupation to be performed at one time.

C. Programmed Instructional Material

Definition:

(1) divides a body of knowledge into a step-by-step progression from start to finish

(2) minute steps permit the student to proceed without assistance from the instructor

(3) provides for self-evaluation and review by the student

Applications of Programmed Instructional Material to the Cluster Concept Curriculum:

(1) permits varying levels of work to be performed at one time in the same room

(2) permits the student to work at his own pace

(3) permits work in more than one occupation to be performed at one time.

D. The Discovery Method

Definition:

(1) encourages the students to find answers to his own problems

(2) used with problems of symbolic or practical nature

Applications of the Discovery Method to Cluster Concept Material

(1) serves well where individual work is involved such as in repair and service operations

E. Instructional Aids

Definition:

(1) may consist of models, films, charts

(2) appeal to sense of sight to supplement sound

Applications of Instructional Aids to the Cluster Concept Curriculum:

(1) strengthen teaching units which are normally of a verbal nature

(2) expose students to operations which cannot be covered in the classroom or on field trips

(3) provide means of enlarging hard-to-see demonstration areas

(4) may serve as self-instructional teaching units

F. Individual Projects

Definition:

(1) a unit of work for which a student is responsible

(2) provide experience in research, design and manipulative activities

(3) based on student interests

Applications of Individual Projects to the Cluster Concept Curriculum:

(1) individual work that gives necessary experience with desired manipulative activities

(2) individual work that will comprise units of a class or group project

2. Methods of Group Instruction

A. Demonstration Lesson

Definition:

(1) consists of four parts; preparation, presentation, applicaton, evaluation

(2) involves the instructor in "show and tell" dialogue with a group of students

(3) used to teach manipulative activities

Applications of Group Demonstrations to the Cluster Concept Curriculum:

(1) introducing units of work

(2) teaching basic manipulative activities

(3) teaching tasks which are important for all to know

B. Instructional Aids

Definition:

(1) may consist of models, films, charts

(2) appeal to sense of sight to supplement sound

Applications of Instructional Aids to the Cluster Concept Curriculum:

(1) strengthen teaching units which are normally of verbal nature

(2) expose students to operations which cannot be covered in the classroom or on field trips

(3) provide means of enlarging hard-to-see demonstration area

C. The Discovery Method

Definition:

(1) encourages the class to find answers to its own problems

(2) involves group interaction

Application of the Discovery Method to the Cluster Concept Curriculum:

(1) solving problems encountered while working on unifying projects

D. The Group Approach

Definition:

(1) involves the class in coordinated activities

(2) features self-administration by group members

Application of the Group Approach to the Cluster Concept Curriculum:

(1) organization of unifying projects

(2) construction of unifying projects

E. Team Teaching

Definition:

(1) involves two or more people

(2) a pooling of talents

(3) a coordinated effort to present a unit of instruction

Applications of Team Teaching to the Cluster Concept Curriculum:

(1) making use of other teachers in the school for a coordinated presentation

(2) making use of resource people outside the school for a coordinated presentation

(3) strengthening the program in area where instructor has insufficient experience

F. Lecture

Definition:

(1) transmitting information mainly by verbal activity

Applications of the Lecture to the Cluster Concept Curriculum:

(1) acquainting students with occupational information

(2) general organizational meetings at the beginning of the units

Procedures and Activities:

1. Teacher: lecturing on constructing lesson plans.
2. Student: writing lesson plans.
3. Class: practicing individual demonstrations through role playing experiences.

4. Teacher: lecturing on the development of instruction sheets.
5. Student: constructing instruction sheets.
6. Class: reviewing student developed instruction sheets.
7. Teacher: conducting a seminar on the development and use of programmed instructional materials.
8. Class: developing programmed instructional material.
9. Student: making a list of commercially prepared programmed materials which are applicable to the cluster concept program.
10. Teacher: demonstrating the discovery method of teaching.
11. Teacher: lecturing on the reasons and methods for using instructional aids.
12. Students: demonstrating the use of instructional aids by means of role playing experiences.
13. Teacher: conducting a panel discussion on using the individual project as a method of teaching.
14. Student: presenting group demonstrations.
15. Class: conducting critiques of group demonstrations.
16. Teacher: lecturing on the group approach.
17. Class: participating in role playing experiences in connection with the group method.
18. Teacher: conducting a panel discussion of team teaching proceudres.
19. Class: demonstrating team teaching techniques through role playing experiences.

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(Chapter i, "Fundamental Bases of Teaching and Learning," pp. 3-33.)
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Unit III. The Evaluation of Program and Curriculum

Purpose: The purpose of this program is to improve the effectiveness of the teacher's efforts to evaluate the curriculum and its effect on the students.

Time: Twelve hours.

Topics:

I. The Purpose of Evaluation.

- A. Definition of Evaluation
  - (1) means to measure student performance
  - (2) assist instructor in determining if goals are met
- B. Evaluation of Learner Achievement
  - (1) have desired skills been learned?
  - (2) does student meet minimum standards acceptable in trade?
  - (3) has desired knowledge, understanding and insight been attained?
- C. Evaluation of Instruction
  - (1) was lesson sequence effective?
  - (2) was subject of instruction covered adequately?
  - (3) are instructional aids adequate?
  - (4) was method and technique of teaching satisfactory?
- D. Identification of Learner Attitudes
  - (1) ability to follow directions
  - (2) personal relations with fellow students
  - (3) tolerance of criticism
  - (4) adaptable to changing conditions
  - (5) mannerisms, language, suitability of dress

E. Evaluation of Student-Teacher Relationship

   (1) reactions in counseling sessions

   (2) patterns of relationships in class

F. Self-Evaluation

   (1) need for change in teaching procedures

   (2) need to change personal behavior

   (3) need for assistance in professional or technical fields

2. Qualities of a Good Evaluative Instrument.

   A. Accurate Measurements; Validity, Reliability

      (1) does the test measure what it proposes to measure?

      (2) does the test yield consistent scores over a period of time?

   B. Clear, Concise, Complete Questions and Directions

      (1) is student sure what information is asked for?

      (2) does student understand procedure to follow in responding to questions?

   C. Ease in Administration, Correction and Scoring

      (1) special materials needed for administration

      (2) can it be completed in a normal class period?

      (3) are answers placed conveniently for reviewer?

      (4) do values assigned to questions allow easy computation of final score?

   D. Fair and Equitable Values Assigned to Questions

      (1) are values assigned to questions equal for questions of comparable import?

3. Objective Tests

   A. True-False

      (1) distribute true and false items at random

      (2) not as accurate as other questions because of 50-50 chance of being right

- (3) a large number of questions should be used
- (4) words such as "always," "never," should be avoided

B. Multiple Choice

- (1) student selects most appropriate answer
- (2) all answers should be plausible
- (3) take care that wording does not indicate answer

C. Completion

- (1) only one word should fit

D. Matching

- (1) the two columns should be unequal in number
- (2) only one correct match for each item

4. Performance Tests

A. Skill Standards

- (1) tools properly sharpened
- (2) correct selection of tools
- (3) correct use of tools
- (4) accuracy obtained

B. Time Standards

- (1) wise use of time
- (2) finished in allotted time

5. Identification Tests

A. Object Identification

- (1) tools, materials, machine parts

B. Picture Identification

- (1) easy to administer
- (2) for objects not found in the shop

6. Written Reports
    A. Reading Assignments
        (1) answering questions
        (2) summarizing the assignment
    B. Field Trips
        (1) reports of processes observed, products manufactured, personnel organizations
    C. Interview
        (1) develop outline before interview
        (2) meet with personnel from employment security trade unions, contractors, service and maintenance facilities
    D. Related Information
        (1) extraction and fabrication processes
        (2) new concepts of manufacture, construction, distribution

7. Conferences
    A. Individual
        (1) personal purposes and objectives
        (2) behavioral and attitudinal discussion
        (3) personal relationships between student and instructor
    B. Group
        (1) evaluation of course objectives
        (2) evaluation of attainment of course objectives
        (3) evaluation of teaching procedures

Procedures and Activities:

1. Teacher: lecturing on specific terms used in connection with tests.

2. Teacher: conducting a panel discussion dealing with evaluation of learner achievement.

3. Teacher: lecturing on the use of tests for evaluation of instruction.

4. Student: diagnosing student needs from test results.

5. Teacher: organizing a seminar on identification of learner attitudes.

6. Student: constructing a record form for recording attitudinal obeservations.

7. Teacher: lecturing on the use of the results for evaluating student-teacher relationships and for self-evaluation.

8. Teacher: securing the services of a resource person in the field of tests and measurements to lecture on the qualities of a good test.

9. Student: checking the reliability of a test.

10. Teacher: lecturing on the use of objective tests.

11. Student: constructing examples of various objective evaluative instruments.

12. Class: reviewing objective tests constructed by students.

13. Student: rewriting poorly worded questions.

14. Teacher: directing a panel discussion on the use of performance and identification tests.

15. Student: designing testing devices to measure skill acquisition and facility of operations.

16. Teacher: lecturing on the use of written reports as evaluative instruments.

17. Student: developing a format for reporting of field trips and interviews.

18. Teacher: directing a panel discussion on the use of conferences as evaluative instruments.

19. Class: using role playing experiences for developing techniques used with evaluative conferences.

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III. TECHNICAL COMPETENCY DEVELOPMENT FOR CLUSTER CONCEPT PROGRAMS

Unit I: Development of Technical Skills in the Construction Cluster

Purpose: The purpose of this unit should be to develop the technical skills and knowledges needed by each teacher-trainee in order to teach the construction cluster.

Time: The amount of time depends on the technical background and practical experience of the individual teacher-trainee.

Topics:

I. Development of Technical Skills and Knowledges.

Each teacher-trainee should develop the technical skills and knowledges needed for proficient performance in the following areas of home construction.

A. Development of technical skills and knowledges in the carpentry area.

(1) fabrication and erection of supporting wood structural units in house construction

(2) fabrication and erection of partitions in house construction

(3) application of sheating and subflooring in house construction

(4) installation of insulation and interior sheathing in house construction

(5) supporting operations for fabrication and erection of structural units in house construction

(6) application of flooring and roof deck materials in house construction

(7) interior installation units in house construction

(8) fabrication and installation of temporary structures for worker safety during house construction

(9) application of roofing materials in house construction

(10) exterior finishing operations in house construction

B. Development of Technical Skills and Knowledges in the Electricity Area.

(1) supporting operations for electrical and related occupations in home construction

(2) introductory work to circuitry in electrical and related occupations in house construction

(3) elementary circuitry in electrical and related occupations in house construction

C. Development of Technical Skills and Knowledges in the Masonry Area.

(1) introductory trowel skills in house construction

(2) processes for forming concrete in house construction

(3) waterproofing procedures on masonry surfaces in house construction

(4) supporting activities for masonry operations in house construction

(5) preparation of forms for receiving concrete in house construction

(6) advanced trowel skills in house construction

(7) introductory experiences in brick laying for house construction

D. Development of Technical Skills and Knowledges in the Painting Area.

(1) preparation of interior and exterior surfaces for a finish for house construction

(2) preparation of finishes and applicators for use in house construction

(3) cleaning and storing painting material

E. Development of Technical Skill and Knowledges in the Plumbing Area.

(1) excavation of earth by hand for house construction

(2) preparing pipe and tubing for installation in house construction

(3) assembling and installation of furnaces and duct work for house construction

(4) preparation of plumbing fixtures for installation in house construction

(5) service operations for plumbing installations in a house

(6) welding and soldering of plumbing installations for a house

(7) installation of plastic pipe and insulation of heating and water lines for a house

2. Industrial Visitations

(1) visiting local home construction sites to view techniques and procedures used on the job

(2) visiting local industrial construction sites to view techniques and procedures used on the job

(3) visiting local apprenticeship programs to view type of programs and teaching techniques used in apprentice training

(4) visiting local construction supplier to familiarize the teacher-trainee with the material available for construction purposes

Procedures and Activities:

1. Instructor: surveying the students to determine areas of limited experience in the construction cluster.

2. Instructor: contacting representatives from labor and management organizations, local and national industrial concerns, local businessmen and employees to arrange training programs to develop in the students the technical skills and knowledges needed in the construction cluster.

3. Instructor: establishing individual training programs to be conducted by local or national industrial organizations or businesses.

4. Teacher-trainee: working in an industrial situation to obtain the technical skills needed for their cluster.

5. Teacher-trainee: obtaining technical information presented through lecture or readings needed for their cluster.

6. Class: engaging in visits and field trips to local community resources and industries engaging in activities to be taught in the construction cluster.

Resources:

Final Report (course outline for the construction cluster). "An Investigation and Development of the Cluster Concept as a Program in Vocational Education at the Secondary School Level." Contract Number OE 685-023.
Available: U.S. Department of Health, Education, and Welfare, Office of Education, Washington, D.C.

Associated General Contractors of America, Inc.
1957 E Street, N.W.
Washington, D.C. 20006

Bricklayers, Masons and Plasterers International
Union of America
815 15th Street, N.W.
Washington, D.C. 20005

Structural Clay Products Institute
1520 18th Street, N.W.
Washington, D.C. 20036

United Brotherhood of Carpenters and Joiners of America
101 Constitution Avenue, N.W.
Washington, D.C.

Operative Plasterers' and Cement Masons' International
Association of the U.S. and Canada
1125 17th Street, N.W.
Washington, D.C. 20036

International Brotherhood of Electrical Workers
1200 15th Street, N.W.
Washington, D.C. 20005

National Electrical Contractors Association
1220 18th Street, N.W.
Washington, D.C. 20036

National Joint Apprenticeship and Training
Committee for the Electrical Industry
1200 18th Street, N.W.
Washington, D.C. 20036

Brotherhood of Painters, Decorators and Paperhangers of America
1925 K Street, N.W.
Washington, D.C. 20006

United Association of Journeymen and Apprentices of the
Plumbing and Pipe Fitting Industry
901 Massachusetts Avenue, N.W.
Washington, D.C. 20001

General Building Contractors Association, Inc.
Suite 1212
Two Penn Center Plaza
Philadelphia, Pa.

National Forest Products Association
1619 Massachusetts Avenue, N.W.
Washington, D.C. 20036

Unit II. Development of Technical Skills in the Electro-Mechanical Installation and Repair Cluster

Purpose: The purpose of this study should be to develop the technical skills and knowledges needed by each teacher in order to teach the electro-mechanical installation and repair cluster.

Time: The amount of time depends on the technical background and practical experience of the individual teacher-trainee.

Topics:

I. Development of Technical Skills and Knowledges.

Each teacher-trainee should develop the technical skills and knowledges needed for proficient performance in the following service areas:

A. Development of Technical Skills and Knowledges in the Area of Air Conditioning and Refrigeration.

(1) testing lines with detection device for leaks

(2) installing the gauge manifold on the condenser to facilitate the evacuation and charging of the unit

(3) removing and replacing the cover on a refrigerator or air conditioning unit

(4) the installation of tubing between the case and condensing unit

(5) introductory experiences in the maintenance of air conditioning and refrigeration

B. Development of Technical Skills and Knowledges in the Area of Business Machine Servicing.

(1) determining the cause and locating the trouble in typewriters

(2) introductory exercises in the servicing of typewriters

(3) replacing components and testing the repaired typewriter

(4) introductory exercises in the servicing of calculators and adding machines

(5) replacing components and testing the repaired calculators and adding machines

C. Development of Technical Skills and Knowledges in the Area of Home Appliance Servicing.

(1) determining the cause and locating the trouble in the small home appliance

(2) introductory exercise in the servicing of small appliances

(3) replacing and repairing the defective parts of small appliances

(4) testing and adjusting small appliances for maximum performance

(5) installation of major home appliances

(6) determining the cause and locating the trouble in the major home appliances

(7) introductory exercises in the servicing of major home appliances

(8) replacing and repairing the defective parts of the major home appliances

(9) testing and adjusting the major home appliances for maximum performance

D. Development of Technical Skills and Knowledges in the Area of Radio and Television Servicing.

(1) observing the symptoms to determine the defective stage of the radio

(2) checking the tubes and isolating the defective components in a particular stage of the radio

(3) removing the chassis, replacing the defective components and replacing the chassis in the cabinet after repairs have been completed

(4) making the final operational checks and adjustments to the radio

(5) determining the defective stage of the television from observation

(6) isolating the defective components and checking the tubes in the suspected stage of the television

(7) the removal and replacement of components in the television

(8) making the final operational checks and adjustments to the television after repairs have been completed

E. Industrial Visitations

(1) visiting local home appliance service centers to view techniques and procedures used in servicing home appliances

(2) visiting local business machine service stores to view techniques and procedures used in servicing business machines

(3) visiting local radio and television service centers to view techniques and procedures used in servicing radio and televisions

(4) visiting a manufacturer of appliances and refrigeration equipment to view the techniques and procedures involved in assembling and testing large appliances

Procedures and Activities:

1. Instructor: surveying the students to determine areas of limited experience in the elctro-mechanical installation and repair cluster.

2. Instructor: contacting representatives from labor and management organizations, local and national industrial concerns, local businessmen and employees to arrange training programs to develop in the students the technical skills and knowledges needed in the electro-mechanical installation and repair cluster.

3. Instructor: establishing individual training programs to be conducted by local or national industrial organizations or businesses.

4. Teacher-trainee: working in an industrial situation to obtain the technical skills needed for their cluster.

5. Teacher trainee: obtaining technical information presented through lecture or readings needed for their cluster.

6. Class: engaging in visits and field trips to local community resources and industries engaging in activities to be taught in the electro-mechanical installation and repair cluster.

Resources:

Final Report (Course Outline for the Electro-Mechanical Installation and Repair Cluster). "An Investigation and Development of the Cluster Concept as a Program in Vocational Education at the Secondary School Level." Contract Number OE 685-023. Available: U.S. Department of Health, Education, and Welfare, Office of Education, Washington, D.C.

Electronics Industries Association
2001 Eye Street, N.W.
Washington, D.C. 20006

Refrigeration Service Engineers Society
433 North Walker Avenue
Chicago, Ill. 60644

Institute of Appliance Manufacturers
2000 K Street
Suite 455
Washington, D.C. 20006

American Home Laundry Manufacturers Association
20 North Wacker Drive
Chicago, Ill. 60606

National Appliance and Radio-TV Dealers Association
364 Merchandise Mart
Chicago, Ill. 60654

Unit III. Development of Technical Skills in the Metal Forming and Fabrication Cluster

Purpose: The purpose of this study should be to develop the technical skills and knowledges needed by each teacher in order to teach the metal forming and fabrication cluster.

Time: The amount of time depends on the technical background and practical experience of the individual teacher-trainee.

Topics:

I. Development of Technical Skills and Knowledges.

Each teacher-trainee should develop the technical skills and knowledges needed for proficient performance in the following areas:

A. Development of Technical Skills and Knowledges in the Assembly Area.

- (1) cutting materials with hand tools
- (2) joining parts of an assembly
- (3) and checking dimensions of parts with precision and non-precision instruments
- (4) aligning parts, clamping and mounting work and filing parts
- (5) cutting materials with hand and power tools
- (6) forming materials with hand tools

B. Development of Technical Skills and Knowledges in the Machining Area.

- (1) machining activities associated with the lathe
- (2) machining activities associated with the drill press
- (3) machining activities performed on the bench grinder

(4) machining activities performed on the shaper

(5) machining activities performed on the lathe

(6) machining activities performed on the drill press

(7) grinding activities associated with the surface grinder

(8) machining activities performed on the horizontal milling machine

(9) machining activities performed on the vertical milling machine

C. Development of Technical Skills and Knowledges in the Sheet Metal Area.

(1) cutting sheet metal with hand tools

(2) forming sheet metal on sheet metal forming machines

(3) joining sheet metal parts

(4) cutting sheet metal with machinery and power tools

D. Development of Technical Skills and Knowledges in the Welding Area.

(1) arc welding ferrous metals with A.C. and D.C. welders

(2) gas welding and brazing ferrous metals

(3) brazing non-ferrous metals

(4) inert gas welding ferrous and non-ferrous metals

Procedure and Activities:

1. Instructor: surveying the students to determine areas of limited experience in the metal forming and fabrication cluster.

2. Instructor: contacting representatives from labor and management organizations, local and national industrial concerns, local businessmen and employees to arrange training programs to develop in the students the technical skills and knowledge needed in the metal forming and fabrication cluster.

3. Instructor: establishing individual training programs to be conducted by local or national industrial organizations in a business.

4. Teacher-trainee: working in an industrial situation to obtain the technical skills needed for their cluster.
5. Teacher-trainee: obtaining technical information presented through lecture or readings needed for their cluster.
6. Class: engaged in visits and field trips to local community resources and industries engaging in activities to be taught in the metal forming and fabrication cluster.

Resources:

Final Report (course outline for the metal forming and fabrication cluster). "An Investigation and Development of the Cluster Concept as a Program in Vocational Education at the Secondary School Level." Contract Number OE 685-023.
Available: U.S. Department of Health Education and Welfare, Office of Education, Washington, D.C.

Sheet Metal and Air Conditioning Contractors
National Association, Inc.
107 Center Street
Elgin, Ill. 60120

Sheet Metal Workers' International Association
100 Connecticut Avenue, N.W.
Washington, D.C. 20036

The American Welding Society
345 East 47th Street
New York, N.Y. 10017

International Association of Machinists and Aerospace Workers
1300 Connecticut Avenue, N.W.
Washington, D.C. 20036

International Union, United Automobile, Aerospace and
Agricultural Implement Workers of America
8000 East Jefferson Avenue
Detroit, Mich. 41214

IV. INSTRUCTIONAL MATERIALS DEVELOPMENT FOR CLUSTER CONCEPT PROGRAMS

Unit I: Function of Instructional Media

Purpose: This unit is intended to acquaint the program participants with the advantages of and reasons for using instructional media in the classroom.

Time: Three hours.

Topics:

A. The Defining of Instructional Media.
   (1) clarifying terminology
   (2) establishing a working definition

B. The Roles Performed by Instructional Media.
   (1) extending the horizon of experience of students
   (2) providing meaningful sources of information for students
   (3) stimulating interest for a wide variety of learning activities
   (4) helping overcome physical difficulties and limitations of the classroom
   (5) assisting the teacher perform diagnostic and remedial work

Procedures and Activities:

1. Teacher-pupil: discussion to elicit the preconceptions of the pupils as to the meaning of the term instructional media.
2. Class: divide into small groups to assemble a workable definition of the term instructional media.
3. Teacher-pupil: discussion and the determination of a working definition of the term instructional media.
4. Teacher: lecture on the various roles of instructional media.

Resources:

Brown, James W., Richard B. Lewis, and Fred F. Harclerod. A-V Instruction; Materials and Methods (2nd ed.). New York: McGraw-Hill. 1964.

Cross, A.J. Foy, and Irene F. Cypher. Audio Visual Education. New York: Crowell. 1961.

Dale, Edgar. Audio-Visual Materials in Teaching. Revised edition. New York: Holt. 1954.

Erickson, Carlton W.H. Fundamentals of Teaching with Audiovisual Technology. New York: Macmillan. 1965.

Freedman, Florence B., and Esther L. Berg. Classroom Teacher's Guide to Audio-Visual Material. Philadelphia: Chilton. 1961.

Wittich, Walter A., and Charles F. Schuller. Audiovisual Materials: Their Nature and Use. 1963.

Unit II: Types of Instructional Media

Purpose: Unit II is intended to acquaint the participants with a wide variety of available media and how and where they may be used in a cluster program.

Time: Eighteen hours.

Topics:

1. The Use of the Video Tape Recorder to:
   - (a) permit students to visualize demonstrations of intricate mechanisms.
   - (b) permit students to see again a previous lesson
2. The Use of the Audio Tape Recorder as:
   - (a) a programmed instruction device
   - (b) a remedial information device
   - (c) a media for review lessons
3. The Use of the Overhead Projector in Classroom Demonstrations and Lectures.
4. The Use of the Filmstrip Projector:
   - (a) in classroom demonstrations
   - (b) for remedial lessons
5. The Use of the Film Projector (16mm and closed loop) for:
   - (a) classroom demonstrations
   - (b) remedial lessons
   - (c) review lessons
6. The Use of the Automatic Slide Projector for Classroom Demonstrations.

7. The Use of the Record Player for:

    (a) classroom demonstrations

    (b) remedial lessons

8. The Use of Charts and Other Graphic Materials for:

    (a) classroom demonstrations

    (b) reference data

Procedures and Activities:

1. Class: demonstrations to the class by instructional materials specialists to explain:

    (a) how to operate the various media

    (b) applications in the classroom for each type of media

    (c) the cost of the demonstrated media

    (d) the amount and extent of the required maintenance

2. Pupils: write to business firms to request information about instructional media products not demonstrated in the class.

3. Pupils: Operation of equipment to familiarize the pupils with the operating procedures.

4. Teacher-pupil: integration of instructional media into the instructional plans developed for the cluster program:

    (a) pupils: review previously developed instructional plans and suggest possible applications for the variety of instructional media

    (b) pupils: prepare one lesson from the cluster program and present to the group. Several types of media should be incorporated

    (c) class: evaluation by pupils and teacher of lesson presentations

5. Class: discussion by pupils to evaluate the roles performed by their present or previous applications of instructional media.

Resources:

Dale, Edgar. Audio Visual Methods in Teaching. New York: The Dryden Press Company. 1955.

Erickson, Carlton W. H. Fundamentals of Teaching with Audiovisual Technology. New York: MacMillian Publishing Company. 1965.

Kinder, James A. Audio Visual Materials and Techniques. New York: American Book Company. 1950.

Unit III: Locating, Previewing, and Evaluating Commercially Prepared Materials

Purpose: Unit III is intended to familiarize the participants with material sources, to provide an opportunity for the development of a list of sources related to each particular cluster, and to provide for the development of evaluation techniques.

Time: Nine hours.

Topics:

1. Locating Sources for the Following Instructional Materials:
    - (a) films
        - 1) 16mm.
        - 2) closed loop
    - (b) filmstrips
    - (c) audio tapes
    - (d) video tapes
    - (e) records
    - (f) transparencies
    - (g) charts and posters
    - (h) service manuals, blueprints, diagrams, etc.
    - (i) programmed materials
2. Previewing and Evaluating Instructional Materials.

Procedures and Activities:

1. Teacher: presentation in class of representative sources of instructional materials.
2. Pupils: out-of-class assignment to locate several manufacturers or sources for each of the topics of this unit.
3. Teacher-pupil: class development of a technique for evaluating insturctional materials.

4. Teacher: directed discussion of the methods and techniques of evaluating commercial materials. View suggested films (see resources).

5. Pupils: out-of-class assignment to obtain and preview a variety of materials for one of the occupations within a cluster.

6. Pupils: evaluation by each of the materials he previewed and a decision as to whether or not the material is applicable for the cluster program.

7. Class: discussion of the types and variety of materials which were selected for use in the cluster program.

Resources

Books

Erickson, Carlton W. H. Fundamentals of Teaching with Audiovisual Technology. New York: MacMillan Company. 1965.

Lysaught, Jerome P., and Clarence M. Williams. A Guide to Programmed Instruction. New York: Wiley & Sons. 1963.

Wittich, Walter A., and Charles F. Schuller. Audiovisual Materials: Their Nature and Use. 3rd edition. New York: Harper and Row. 1962.

Films

"Choosing a Classroom Film"
16mm, b&w, 18 min.
McGraw-Hill Publishing Company
330 W. 42nd Street
New York, N.Y.

"Photographic Slides for Instruction"
16mm, b&w, 10 min.
Indiana University
Audio-Visual Center
Bloomington, Indiana

"Selecting and Using Ready-Made Materials"
16mm, b&w, 17 min.
McGraw-Hill Publishing Company
330 W. 42nd Street
New York, N.Y.

Unit IV. Construction of Materials

Purpose: The purpose of this unit is to train the participants in the methods of constructing instructional materials. Both comprehensiveness and proficiency should be emphasized in this unit.

Time: Eighteen hours.

Topics:

1. Recognizing the need for materials other than those commercially available.
2. Selecting the most appropriate materials.
3. Construction of materials.
    - (a) transparencies
    - (b) audio tapes
    - (c) slides
    - (d) (other individual selection)
        - 1) film or filmstrip
        - 2) video tape
        - 3) charts
        - 4) models
4. Evaluation of developed materials

Procedure and Activities:

1. Pupils: out-of-class analysis of one instructional plan for the cluster program to determine the areas of need for instructional materials.
2. Class: presentation by each pupil of his selected instructional plan and suggested instructional materials. Discussion of the best materials or media to utilize in each pupil's instructional plan.
3. Class: participation in training workshop for transparency production (arrange through Tecnifax Corporation).

4. Teacher: demonstration by instructional materials specialist on techniques used in recording audio tapes.

5. Teacher: demonstration by instructional materials specialist on the techniques of slide construction.

6. Pupils: construction of three types of materials to be used with the instructional plans for one occupation.

    (a) transparencies

    (b) audio tapes

    (c) slides

7. Pupils: selection of a fourth type of instructional material to be developed out-of-class.

8. Class: pupil presentations utilizing many of the developed materials.

9. Class: in-class discussion and evaluation of all developed materials.

    (a) need

    (b) effectiveness

    (c) durability

Resources:

deKieffer, Robert, and Lee W. Cochran. Manual of Audio-Visual Techniques (2nd edition). Englewood Cliffs, N.J.: Prentice-Hall. 1961.

Frye, Edward B. Teaching Machines and Programmed Learning: An Introduction to Autoinstruction. New York: McGraw-Hill Publishing Company. 1962.

Guide for Preparation and Use of Audio-Visual Instructional Materials (Indiana University Film Series). Bloomington, Indiana: Audio-Visual Center, Indiana University. 1958.

Minor, Ed. Preparing Visual Instructional Material. New York: McGraw-Hill Publishing Company.

Films: "Creating Instructional Materials."
16mm, b&w, 15 min.
McGraw-Hill
330 W. 42nd Street
New York 36, N.Y.

"Handmade Materials for Projection."
16mm., b&w, 20 min.
Indiana University
Audio-Visual Center
Bloomington, Indiana

"Lettering Instructional Materials"
16mm, b&w, 20 min.
Indiana University
Audio-Visual Center
Bloomington, Indiana

"Photographic Slides for Instruction"
16mm, b&w, 10 min.
Indiana University
Audio-Visual Center
Bloomington, Indiana

"Poster Making: Design and Technique"
16mm, color, 10 min.
Bailey Films, Incorporated
6509 DeLongpre Avenue
Hollywood, California

"Tape Recording for Instruction"
16mm, b&w, 15 min.
Indiana University
Audio-Visual Center
Bloomington, Indiana

APPENDICES

APPENDIX A

TEACHER INFORMATION SHEET

CLUSTER CONCEPT PROJECT

Teacher Information

1. Name____ 2. Date____________
(Last) (First) (Middle)

3. Home Address______________________________ 4. Home Phone__________
(Street)

____
(City) (State)

5. School Address____________________________ 6. School Phone__________
(Street)

____
(City) (State)

7. Age_____ Birthdate__________________________ 8. Soc. Sec. No.__________
(Month) (Day) (Year)

9. Marital Status: Single___Married___ 10. Number of dependents____________

11. Height___'___" 12. Weight_____ 13. Physical defects: (Explain)__________

____

____

14. Cluster you are most interested in teaching:

Construction Cluster_____
Metal Forming & Fabrication Cluster_____
Electro-Mechanical Installation and Repair Cluster_____

15. Are you presently enrolled in the University of Maryland Graduate School?
Yes_____No_____

16. Credits to be applied toward:
1. Master's Degree_____
2. Certification Requirement_____
3. Other_____

17. MILITARY SERVICE

____
(Branch) (Rank) (Dates)

Nature of work:____

____

____

18. EDUCATIONAL PREPARATION

(1) Secondary

(Name) (City) (State)

(Date of Graduation) (Major: Vocational, General, Academic)

(2) College (Undergraduate)

(Name of Institution) (City) (State)

(Date of Graduation) (Degree or certification)

(Major) (Minor)

(3) College (Graduate)

(Name of Institution) (City) (State)

(Date of Graduation or Date of Last Attendance) (Degree or Certification)

(Major) (Number of credit hours) (Minor) (Number of credit hours)

(4) Other (Military, trade schools, summer workshops, etc.)

(5) Scholastic Honors or Extra-curricular Activities:

High School:

College:

19. RELATED PROFESSIONAL EXPERIENCES

Membership in Professional Organizations Offices Held

20. TEACHING EXPERIENCE - INDUSTRIAL ARTS
(Give last three positions held)

(1)______
(Name of School or Agency) (City) (State)

______
(Dates From - To) (Grades Taught) (Subject)

(2)______
(Name of School or Agency) (City) (State)

______
(Dates From - To) (Grades Taught) (Subject)

(3)______
(Name of School or Agency) (City) (State)

______
(Dates From - To) (Grades Taught) (Subject)

21. TEACHING EXPERIENCE - VOCATIONAL EDUCATION
(Give last three positions held)

(1)______
(Name of School or Agency) (City) (State)

______
(Dates From - To) (Grades Taught) (Subject)

(2)______
(Name of School or Agency) (City) (State)

______
(Dates From - To) (Grades Taught) (Subject)

(3)______
(Name of School or Agency) (City) (State)

______
(Dates From - To) (Grades Taught) (Subject)

22. TEACHING EXPERIENCE - ADULT EDUCATION
(Give last three positions held)

(1)____
(Name of School or Agency) (City) (State)

____
(Dates From - To) (Subject)

(2)____
(Name of School or Agency) (City) (State)

____
(Dates From - To) (Subject)

(3)____
(Name of School or Agency) (City) (State)

____
(Dates From - To) (Subject)

23. WORK EXPERIENCE: (Business, Industry, Trades, Summer occupations, etc.) Give last five work experiences.

(1)____
(Firm Name) (Dates From - To)

__________________________________ Full Time____ Part Time______
(Nature of Work)

(2)____
(Firm Name) (Dates From - To)

__________________________________ Full Time____ Part Time______
(Nature of Work)

(3)____
(Firm Name) (Dates From - To)

__________________________________ Full Time____ Part Time______
(Nature of Work)

(4)____
(Firm Name) (Dates From - To)

__________________________________ Full Time____ Part Time______
(Nature of Work)

(5)____
(Firm Name) (Dates From - To)

__________________________________ Full Time____ Part Time______
(Nature of Work)

APPENDIX B

INTERVIEW SCHEDULE

University of Maryland
Department of Industrial Education
Cluster Concept Project

Interview Schedule

1. Administering the interview:

The primary purpose of the interview is to evaluate the responses of the interviewee on the rating scale following each question. The quality of the answer should be judged only in terms of the examples of unacceptable and ideal responses. In order to gather information suitable for making the judgement called for, it will be necessary to conduct the interview in a manner that provokes the interviewee into doing most of the talking. In addition, attention must be paid to guiding the interview in the direction which will supply the information desired.

2. Getting the interview started:

The interviewer should establish a pleasant atmosphere before proceeding to the questionaire and should avoid giving the impression that the interview must be conducted on a time schedule. Attention should also be paid towards providing adequate physical facilities such as privacy, ash trays and comfortable chairs.

After reviewing the personal information at the beginning of the questionaire, as a means of establishing rapport, go directly to the first question unless the interviewer feels that a sufficient amount of warmth has not been developed. Should the latter occur, it is suggested that one or more "warm up" questions be used similar to those suggested on the page following the personal information. Avoid doing any writing during the interview and refer to the questionaire only if it is not possible to remember the question.

3. Checking the progress of the interview:

Keep the interview moving along, again, without giving the impression of meeting a time schedule or conveying the impression that the interviewee is being overly verbose. The interviewee should be left to interpret the question on his own and should not be aided in answering other than to repeat the question if a response is not forthcoming after a reasonable length of time.

4. Terminating the interview:

The interviewee should not be given any indication of the worth of his answers. Close the interview by thanking the interviewee and expressing appreciation for having been able to talk with him.

5. Warm up questions: The following questions may help initiate an informal atmosphere at the beginning of the interview.

   Examples of "warm up" questions:

   a. What type of practical experience have you had?

   b. How many students do you meet each day?

   c. Are you native to this area?

   d. How old is this school building?

   e. What do you think about the Cluster Concept?

6. Personal information of candidate:

   Name____________________________________

   School____________________________________

   Date____________________________________

   Time____________________________________

7. Comments of interviewer:

A. COMMITTMENT TO TEACHING

1. WHAT REASONS DO YOU HAVE FOR WANTING TO TEACH IN A PILOT PROGRAM OF THE CLUSTER CONCEPT?

Unacceptable: Does not like present position, desires a change. Might get some new equipment. It's something different.

Ideal: Concerned about future employment opportunities of youth. Desire to learn and further education. Desire to improve self.

0 5 10

2. WHAT PERSONAL CHARACTERISTICS (TALENTS, SKILLS OR ATTITUDES) DO YOU BELIEVE A TEACHER SHOULD HAVE TO TEACH IN THE CLUSTER CONCEPT PILOT PROGRAM?

Unacceptable: Able to organize physical facilities. Discipline. Superb technical skill.

Ideal: Desire to try new things. A leader. Occupational experience. Is flexible.

0 5 10

B. EVIDENCE OF A FEELING OF WARMTH TOWARD STUDENTS

3. WHEN YOU VISIT A TEACHER IN HIS CLASSROOM WHAT ARE SOME THINGS WHICH CAN BE OBSERVED CONCERNING THE TEACHER AND THE STUDENTS WHICH COULD LEAD YOU TO AN EVALUATION OF THE EDUCATIONAL OFFERING?

Unacceptable: Tight discipline. Instructor in control of activities and access to tools and materials.

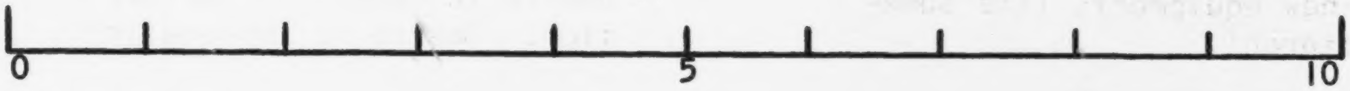
Ideal: Cordial teacher-student relationships. Teacher not a dispensor of all information. Student initiative evident.

0 5 10

4. HOW DO YOU FEEL ABOUT THE COMMENT THAT A TEACHER SHOULD BE MORE INTERESTED IN THE DEVELOPMENT OF PEOPLE THAN IN THE MAKING OF THINGS ON THE PART OF THE STUDENTS?

Unacceptable: Parents like to see projects brought home. They have been our biggest selling point.

Ideal: The ultimate aim of education is the development of good citizens.

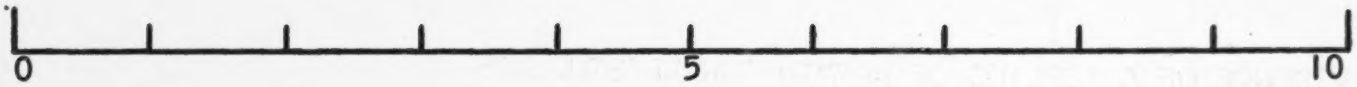


C. FLEXIBILITY AND PERSONAL ORGANIZATION

5. HOW DO YOU FEEL THE RESPONSIBILITIES OF A PERSON INVOLVED IN TEACHING AN EXPERIMENTAL COURSE WOULD DIFFER FROM A TEACHER OF AN ESTABLISHED SUBJECT?

Unacceptable: A lot of time required to make physical rearrangements. More time will be necessary for planning.

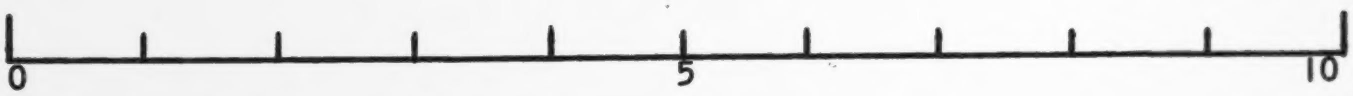
Ideal: More detailed planning, new resources to investigate. Should not be too much difference because a good teacher is always trying new materials and methods. More evaluation will be necessary. Flexible and open-minded.



6. YOU HAVE PLANNED A DEMONSTRATION INVOLVING THE PREPARATION, OPERATION, USE, CLEAN-UP AND MAINTENANCE OF A CONCRETE MIXER WHICH WOULD NORMALLY TAKE ALL PERIOD. FIVE MINUTES AFTER THE CLASS BEGINS A SPECIAL ASSEMBLY OF ALL STUDENTS AND FACULTY WAS ANNOUNCED TO BEGIN AT THE MIDDLE OF THE PERIOD. WHAT WOULD YOU DO?

Unacceptable: Stop the lesson and plan on starting over next day. I don't know what I would do.

Ideal: I wouldn't plan this much for one day anyway. Introduce the topic but not mix any cement.



D. CONCERN FOR PHYSICAL APPEARANCE OF THE CLASSROOM

7. WHAT IMPLICATIONS MIGHT BE MADE CONCERNING A PERSON'S SUCCESS IN TEACHING FROM VISITING HIM IN HIS HOME WORKSHOP?

Unacceptable: Successful because of accuracy and appearance of completed work. Quantity and quality of personal tools and equipment.	Ideal: Relationship is questionable. Organization of room, work, tools and materials is one indication of a desirable teacher. Improvised methods evident to make up for lack of equipment.

0 5 10

8. ARE THERE ANY CONNECTIONS THAT CAN BE MADE BETWEEN THE APPEARANCE OF A SHOP AND THE QUALIFICATIONS OF A TEACHER?

Unacceptable: A shop is a place to work. Housekeeping is not a measure of the quality of work turned out.	Ideal: Appearance is important as a conveyor of an attitude. Helps student learn a value system. An organized shop usually means an organized program. Good housekeeping doesn't necessarily mean a good program.

0 5 10

E. USING STUDENT CONTRIBUTIONS - CONCERN FOR STUDENT FEELING

9. WHILE YOU ARE TEACHING A RATHER DIFFICULT LESSON A STUDENT ASKS A QUESTION THAT IS NOT DIRECTLY RELATED TO THE TOPIC. IF YOU SHOULD FEEL THAT THE CONTINUITY OF THE TOPIC IS BEING THREATENED, HOW WOULD YOU PROPOSE TO RESPOND TO THE STUDENT?

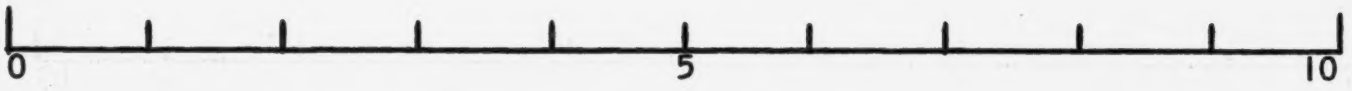
Unacceptable: Ask him to repeat the question when we are on the appropriate unit. Explain that this was not the topic we were concerned with.	Ideal: Try to interpret the question to the class so that it would have relevance to the topic. In some way give the student a feeling of contribution to the topic.

0 5 10

10. THE REMARK HAS BEEN MADE THAT THE HIGHLY INFORMAL ATMOSPHERE OF THE LOWER ELEMENTARY GRADE CLASSROOM HOLDS MANY IMPLICATIONS FOR USE IN HIGH SCHOOL AS WELL. HOW WOULD YOU RESPOND TO SUCH A STATEMENT?

Unacceptable: Women teachers can do a better job of this than men. The extent of work to be covered in high school precludes this type of approach.

Ideal: More maturity should be expected of high school students but group methods, class interaction and informal atmosphere will contribute to superior learning situations.

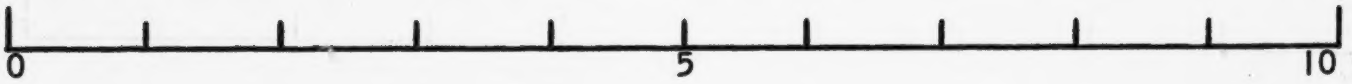


F. ORGANIZATION OF SUBJECT MATTER

11. WHAT WOULD YOU DO IF YOU ENCOUNTERED A SEGMENT OF THE CURRICULUM YOU DID NOT FEEL CAPABLE OF TEACHING?

Unacceptable: Cover what I could, Would not attempt to teach it.

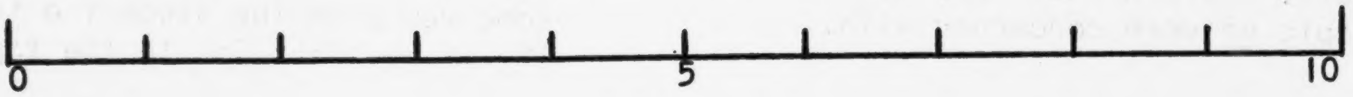
Ideal: Make every effort to improve my knowledge. Contact an expert in the subject to teach it.



12. WHAT IS THE MOST EFFECTIVE TEACHING METHOD YOU HAVE HAD EXPERIENCE WITH AND WHY DO YOU THINK IT HAS BEEN SUCCESSFUL?

Unacceptable: Elaborately describes one method that is used almost exclusively.

Ideal: Has no method considered most effective. Describes or infers that several methods are used. Method varies with students and material to be presented.



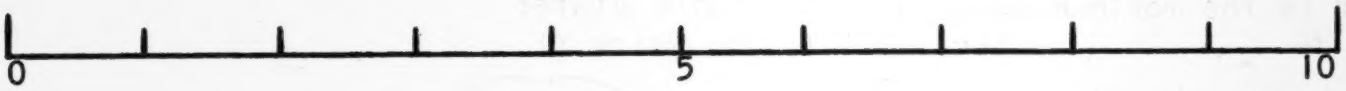
G. ABILITY TO SOLVE INSTRUCTIONAL PROBLEMS

13. THIS IS A TEST OF ELEMENTARY BLUEPRINT READING. WE WOULD LIKE YOU TO CORRECT THIS TEST. THE CORRECT ANSWERS ARE ON THE RIGHT.

UPON COMPLETING THE CORRECTION OF THE PAPER ASK:
WHAT EVALUATIONS OR JUDGEMENTS WOULD YOU MAKE OF THE STUDENT BASED ON THE RESULTS OF THE TEST?

Unacceptable: He has four wrong. He is not a good student. He needs more practice in blueprint reading. His calculations are not correct.

Ideal: The student has problems in reading radii. He does not understand radii or the concept of radius.

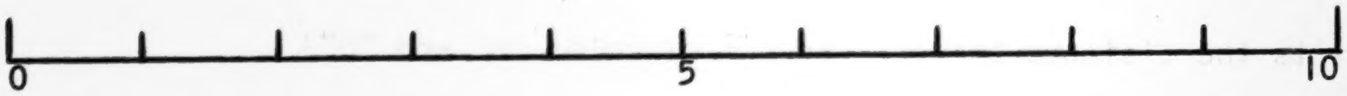


14. THIS IS A TEST OF APPLIED MATHEMATICS. WE WOULD LIKE YOU TO CORRECT THIS TEST. THE CORRECT ANSWERS ARE ON THE RIGHT.

UPON COMPLETING THE CORRECTIONS OF THE PAPER ASK:
WHAT EVALUATIONS OR JUDGEMENTS WOULD YOU MAKE OF THE STUDENT BASED ON THE RESULTS OF THE TEST?

Unacceptable: The student has three questions wrong. He needs more practice. His calculations are not correct.

Ideal: The student's main problem is in placement of the decimal point. His computational work is satisfactory.



13.

From the drawing of the latch plate on the preceding page answer the following questions:

a. What is the distance from the left edge to the center of hole "A"?

$3\frac{1}{2}\frac{4}{8}$

$1\frac{5}{8}$

$4\frac{9}{8}$ $1\frac{1}{8} = 5\frac{1}{8}$ ↗

$6\frac{5}{16} - 5\frac{1}{8}\frac{2}{16} = 1\frac{3}{16}$

$1\frac{3}{16} \div 2 = \frac{16}{2} + \frac{3}{32} = \boxed{\frac{19}{32}}$ Ans.

32

Ans. 9/16"

b. What is the radius of the 4 drilled holes?

$\boxed{\frac{1}{2}"}$ Ans.

Ans. 1/4"

c. What is the maximum opening in the latch plate?
(From Point X to Point Y)

$1\frac{5}{8}\frac{10}{16}$

$\frac{7}{16}$

$1\frac{17}{16}$

$1\frac{17}{16}$

$1\frac{1}{16}$

$2\frac{1}{16}$

$\boxed{2\frac{1}{16}"}$ Ans

Ans. 2 1/2"

d. What is the smallest opening in the latch plate?

$\boxed{1\frac{1}{4}"}$ Ans

Ans. ! 1/4"

e. What is the total width of the latch plate?

$3 + \frac{1}{4} + \frac{1}{4} + \frac{9}{16} + \frac{9}{16} =$

$3 + \frac{4}{16} + \frac{4}{16} + \frac{9}{16} + \frac{9}{16} = 3 + \cancel{\frac{26}{16}}\ 1\frac{10}{16} = 4\frac{10}{16} = \boxed{4\frac{5}{8}}$ Ans

Ans. 4 1/8"

f. What is the distance between centers of holes "A" and "B"?

$\boxed{3\frac{1}{2}"}$ Ans

Ans. 3 1/2"

14.

a. A blueprint specifies that three finished pieces are to be cut from a 1/2" round bar. These pieces measure .690", 4.206", and 1.361". Allow .120" for each cut and .007" for finishing each end of each piece. What is the minimum amount of stock that will be used up?

.007
6
.042

~~.0~~
.120
3
.360

.690
4.206
1.361
.042
.360
6.659 Ans.

Ans. 6.659

b. What is the inside diameter of a pipe whose outside diameter is 3/4" and the sidewalls of which are .106" thick?

.106
.106
.212

4) .30 (.75
28
20
20

.75
.212
5.38 Ans.

Ans. .538"

c. How many pieces of stock 1.39" long can be obtained from a bar 2 feet long?

12
2
24

1.39) 24.0 (17.2
139
1010
973
370
278

~~1.72~~
17 Ans.

Ans. 17

d. What is the cross-sectional area of a piece of bar stock measuring .375" X .750"?

.375
750
18750
2625
.281250

2.81 sq in Ans.

Ans. .28 sq.in.

e. What are the maximum and minimum diameters of a hole specified as 1.875"D, ±.002"?

1.875
.002
1.873 Min Ans.

1.875
.002
1.877 Max. Ans.

Ans. 1.873"D.min.
1.877"D.max.

f. How many cubic inches of material are wasted when a piece of material is reduced from 1.5" X 2.25" X 3.6" to 1.25" X 2" X 2.75"?

1.25
2
2.50

2.75
2.5
1375
550
6.875

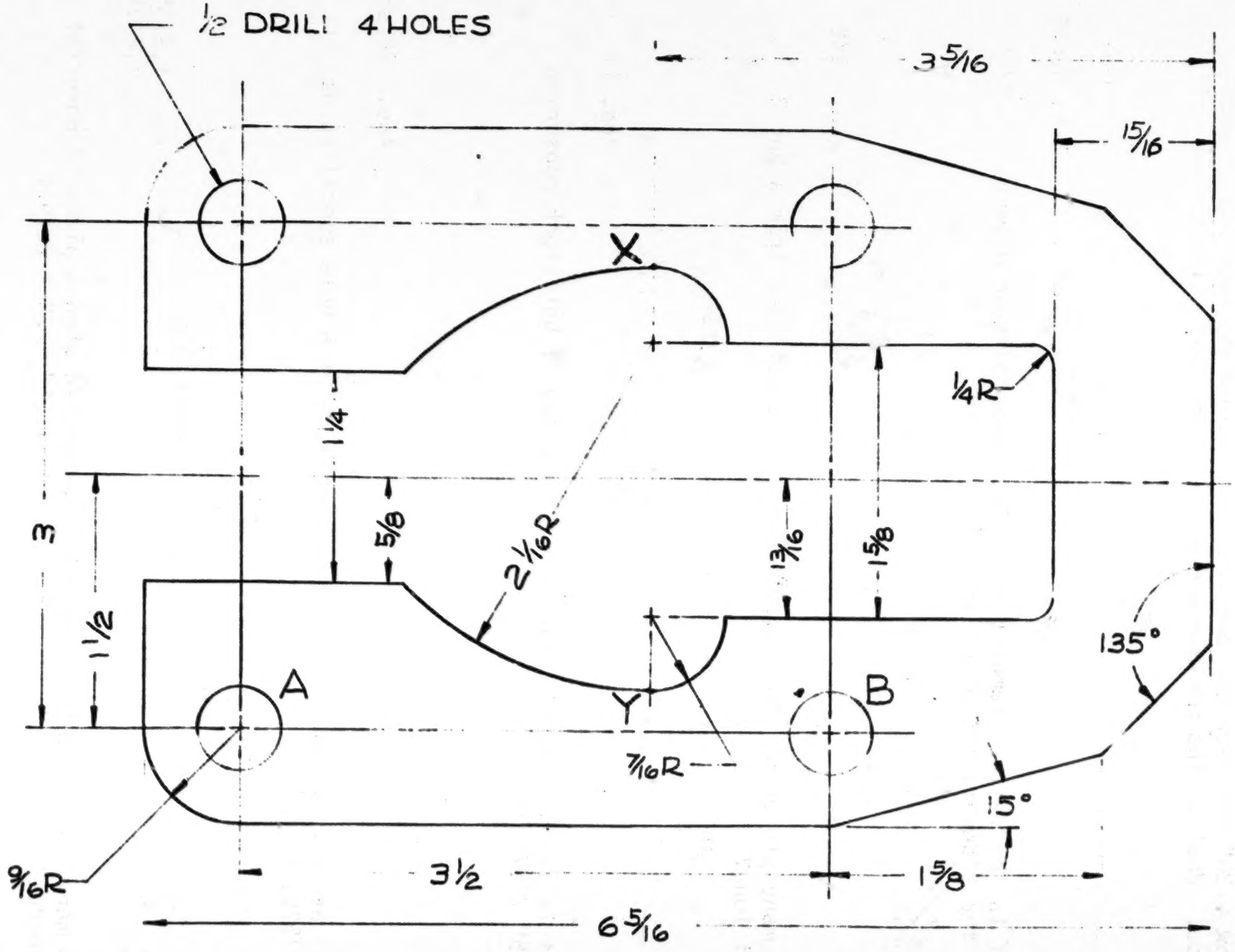
2.25
1.5
1125
225
3.375

3.375
3.6
20250
10125
12.1500

12.150
6.875
5.275 cu. in Ans.

Ans. 5.275 Cu.in.

LATCH PLATE


½ DRILL 4 HOLES
3 5/16
15/16
X
¼R
1¼
3
5/8
2 1/16R
13/16
1 5/8
1½
135°
A
B
Y
7/16R
15°
9/16R
3½
1 5/8
6 5/16

APPENDIX C

TEACHER EVALUATION COMPOSITE

TEACHER EVALUATION COMPOSITE

I. TEACHER INFORMATION:

Name: ____________________ County: ____________

School: ____________________________________

School Phone: __________ Home Phone: ____________

Desired Cluster: ____________________________

Designated Cluster: __________________________

Age: ______ Marital Status: ______ Number of Dependents: ________

II. INTERVIEW SCHEDULE RATINGS:

	Rating on Individual Question	Competency	Competency Rating (Average)
1.	______	A. Committment to Teaching	______
2.	______		
3.	______	B. Evidence of a Feeling of Warmth Toward Students	______
4.	______		
5.	______	C. Flexibility and Personal Organization	______
6.	______		
7.	______	D. Concern for Physical Appearance of the Classroom	______
8.	______		
9.	______	E. Using Student Contributions-Concern for Student Feeling	______
10.	______		
11.	______	F. Organization of Subject Matter	______
12.	______		
13.	______	G. Ability to Solve Instructional Problems	______
14.	______		

Total Average Rating. . . . . ☐

Percentile . . . . ______

Rank in County. . . . . ______

III. ROKEACH'S TEST SCORE:

Raw Score . . . . ☐

Percentile . . . . ______

Rank in County. . . . . ______

IV. TEACHING EXPERIENCE:

	Area	Months	Total
Industrial Arts			
Vocational			
Adult			
Other			

V. OCCUPATIONAL EXPERIENCE:

		Months	Total
Type of Work			
Military			

VI. EDUCATIONAL PREPARATION:

	Major	Minor
____ Vocational Certification		
____ B. S.		
____ B. S. + 30		
____ M. A.		
____ M. A. + 30		

VII. SCHOOL FACILITIES:

0 |___|___|___|___|___|___|___|___|___|___| 10

VIII. SCHOOL ADMINISTRATION:

0 |___|___|___|___|___|___|___|___|___|___| 10

IX. SUPERVISOR'S COMMENTS:

X. SUPERVISOR'S RATING BY RANK:

XI. PANEL'S COMMENTS:

XII. PANEL'S RATING BY RANK:

APPENDIX D

SCHEDULE OF ACTIVITIES FOR THE SPRING SEMESTER PROGRAM

SCHEDULE OF ACTIVITIES FOR SESSION #1

1a

WEEK OF	GROUP	OBJECTIVE	PERSONNEL	PROJECT TEAM ACTIVITIES
				Group Lecture to include:
Feb. 7,9	Class Activity	To develop an understanding of the Cluster Concept as a program in vocational education on the secondary school level.	Warren Smeltzer and County Supervisors	Welcome
			Dr. Donald Maley	Overviews of the Cluster Concept Program
			Nevin Frantz	Description of Research Procedures
			Luther Burse	Formation of Occupational Clusters
			Tom Jones	Task identification and description in behavioral terms
			Andrew Baron	Job entry task identification
			Kenvyn Richards	Task Analysis and Description in behavioral terms.
			Edwin Boyer	Identification of common areas of human requirement and development of the course outlines
			Nevin Frantz	Review
	Cluster Groups	To analyze a task from the first unit of each occupational area of the chosen cluster.		Advise and help individuals in analyzing a task according to areas of human requirement.

SCHEDULE OF ACTIVITIES FOR SESSION #I (Continued)

METHODS	MATERIALS	STUDENT ACTIVITIES
Lecture method using:	Equipment:	Observe and be receptive
1. Visuals 2. Overhead 3. Charts	Overhead Projector Projection Screen Easel (for flip charts) Extension Cord Charts Name Cards	Opportunity for questions
	Final Report (CCP)	
	List of tasks for each occupation	
	Notebooks and folders	
	Completing task analysis Map Task Chart	
Individual Cluster Discussions	Final Report (CCP) List of tasks for first of assigned units within an occupation. Course outlines (other states) Books, etc.	Choose a task to analyze within the assigned occupation of the cluster. Choose the CCP information which might be helpful and sign out. Begin identifying areas of human requirement of the chosen task.

1c

SCHEDULE OF ACTIVITIES FOR SESSION #1 (Continued)

ASSIGNMENT FROM PREVIOUS LESSON	ASSIGNMENT FOR NEXT LESSON	NOTES
NONE	List all areas of human requirement which would be required to teach the task chosen.	

2a

SCHEDULE OF ACTIVITIES FOR SESSION #2

WEEK OF	GROUP	OBJECTIVE	PERSONNEL	PROJECT TEAM ACTIVITIES
Feb. 14,16	Class	To develop within the student the ability to write statements in behavioral terms.	Tues. Nevin Andy Luther Tom	Presentation of film strip Review response sheet
			Thurs. Nevin Ken Ed Tom	Presentation of overlays explaining how the Cluster Concept made statements in behavioral terms.
	Group	Check teacher list of areas of human requirement for completeness.		Check teacher list against Cluster Concept master list.
		To state specific items of human requirement in behavioral terms.		Help teacher write task skills in behavioral terms.
	Class	To identify factors necessary to teach the content.		List on the board all factors identified by the teachers.

2b

SCHEDULE OF ACTIVITIES FOR SESSION #2 (continued)

METHODS	MATERIALS	STUDENT ACTIVITIES
Film strip	Film strip projector Projection screen Extension cord Sheet for film strip responses	Record film strip responses on sheet provided
Overhead Projection	Overhead projector Overlays	Take notes
Individual Cluster discussions	Course outlines	Review list with research assistants
Individual Cluster discussions		Begin writing all specific terms of human requirement, for the chosen task, in behavioral terms.
Discussion	Chalk board Chalk	Suggest all possible factors necessary for teacher to present content to students.

SCHEDULE OF ACTIVITIES FOR SESSION #2 (continued)

ASSIGNMENT FROM PREVIOUS LESSON	ASSIGNMENT FOR NEXT LESSON	NOTES
List of all specific items of human requirement necessary to teach the chosen task.		
	Develop format for instructional plan using items identified in this class discussion. Use pencil or type.	

3a

SCHEDULE OF ACTIVITIES FOR SESSION #3

WEEK OF	GROUP	OBJECTIVES	PERSONNEL	PROJECT TEAM ACTIVITIES
Feb. 21,23	Class	To develop tentative format for the instructional plan.	Tues. Nevin Andy Luther Tom Thurs. Nevin Ken Ed Tom	Each student prepare overlay of assignment due.
	Group	Develop instructional plan for first assigned tasks according to the tentative format.		Observe and advise. Broaden their instructional plan by acquainting them with supplementary instructional materials.

SCHEDULE OF ACTIVITIES FOR SESSION #3

METHODS	MATERIALS	STUDENT ACTIVITIES
Overhead projection Discussion	Overhead projector Thermo-Fax machine Blank transparencies	Present their format on overhead projector for class evaluation.
Independent study		To analyze chosen task according to a tentative format for the instructional plan.
Discussion	Books, charts, etc. and other instructional materials. 1. metal 2. construction 3. electro-mechanical 4. general	To further broaden their instructional plan.

3c

SCHEDULE OF ACTIVITIES FOR SESSION #3

ASSIGNMENT FROM PREVIOUS LESSON	ASSIGNMENT FOR NEXT LESSON	NOTES
Format for instructional plan for the chosen task.		
	Due - Feb. 27-29 Instructional plans for the first group of assigned tasks according to the established format.	

4a

SCHEDULE OF ACTIVITIES FOR SESSION #4

WEEK OF	GROUP	OBJECTIVES	PERSONNEL	PROJECT TEAM ACTIVITIES
Feb. 28 Mar. 2	Class	Electronic Futures Industry presentation on tape systems applicable for vocational education.	Tues. Nevin Andy Luther Tom	Observe. Make suggestions as to specific applications.
		Establish final instructional plan format.	Thurs. Nevin Ken Ed Tom	To present final format for acceptance.
	Groups	To develop instructional plans according to final format.		To advise

4b

SCHEDULE OF ACTIVITIES FOR SESSION #4

METHODS	MATERIALS	STUDENT ACTIVITIES
Industrial Demonstration	Supplied by industrial representative	Observe. Make suggestions as to specific applications.
Overhead presentation. Hand out sheets of format	Overhead projector Screen Extension cord Transparency	Study hand-out sheet.
Independent study	Instructional materials (Methods & Content) for each cluster.	Developing instructional plans based on final format.

4c

SCHEDULE OF ACTIVITIES FOR SESSION #4

ASSIGNMENT FROM PREVIOUS LESSON	ASSIGNMENT FOR NEXT LESSON	NOTES
	Continue analysis of first group of tasks according to instructional plan format.	

SCHEDULE OF ACTIVITIES FOR SESSION #5

WEEK OF	GROUP	OBJECTIVES	PERSONNEL	PROJECT TEAM ACTIVITIES
Mar. 7,9		To develop instructional plans, according to final format, for first group of tasks.	Tues. Nevin Andy Luther Tom Thurs. Nevin Ken Ed Tom	Review prepared teacher instructional plans. Advise of information in files.

5b

SCHEDULE OF ACTIVITIES FOR SESSION #5

METHODS	MATERIALS	STUDENT ACTIVITIES
Independent study	Files of general information, pamphlets for each cluster; books, covers of study, etc. Wall charts.	Fill in instructional plans. Review all available literature.

SCHEDULE OF ACTIVITIES FOR SESSION #5

ASSIGNMENT FROM PREVIOUS LESSON	ASSIGNMENT FOR NEXT LESSON	NOTES
Instructional plans for first group of tasks.	For March 21, 23, second group of instructional plans.	

6a

SCHEDULE OF ACTIVITIES FOR SESSION #6

WEEK OF	GROUP	OBJECTIVES	PERSONNEL	PROJECT TEAM ACTIVITIES
Mar. 14, 16	Class	Presentation of video-tape systems applicable for vocational education.	Tues. Nevin Andy Luther Tom Thurs. Nevin Ken Ed Tom	Observe. Make suggestions as to specific applications.
	Groups	To return and feed back information regarding first assignment of instructional plans.		To offer suggestions and revisions for instructional plans turned in last week.
		To develop group two instructional plans.		To advise.

6b

SCHEDULE OF ACTIVITIES FOR SESSION #6

METHODS	MATERIALS	STUDENT ACTIVITIES
Industrial demonstration	Systems supplied by industrial representatives	Observe. Make suggestions as to specific applications
Individual conferences	Instructional plans from group which were due last week.	To improve and strengthen group one instructional plans as recommended.
Independent study	Instructional plan work sheets. Instructional resource materials (methods and content) for each cluster.	

6c

SCHEDULE OF ACTIVITIES FOR SESSION #6

ASSIGNMENT FROM PREVIOUS LESSON	ASSIGNMENT FOR NEXT LESSON	NOTES
	Group two of instructional plans due at the end of next lesson.	

7a

SCHEDULE OF ACTIVITIES FOR SESSION #7

WEEK OF	GROUP	OBJECTIVES	PERSONNEL	PROJECT TEAM ACTIVITIES
Mar. 21, 23	Groups	To develop instructional plans according to the given format.	Tues. Nevin Andy Luther Tom Thurs. Nevin Ken Ed Tom	Review prepared teacher instructional plans. Advise of information in files, films, wall charts, etc.

SCHEDULE OF ACTIVITIES FOR SESSION #7

ASSIGNMENT FROM PREVIOUS LESSON	ASSIGNMENT FOR NEXT LESSON	NOTES
Second group of instructional plans due.		
	Apr. 4,6 for third group of instructional plans.	

SCHEDULE OF ACTIVITIES FOR SESSION #7

METHODS	MATERIALS	STUDENT ACTIVITIES
Independent study	Files of general information, pamphlets for each cluster; books, films, wall charts, etc.	Fill in instructional plans. Review all available literature.

8a

SCHEDULE OF ACTIVITIES FOR SESSION #8

WEEK OF	GROUP	OBJECTIVES	PERSONNEL	PROJECT TEAM ACTIVITIES
Mar. 28, 30	Individual groups	To develop instructional plans according to the given format.	Tues. Nevin Andy Luther Tom Thurs. Nevin Ken Ed Tom	Review prepared teacher instructional plans. Advise of information in files, films, wall charts, etc.

SCHEDULE OF ACTIVITIES FOR SESSION #8

METHODS	MATERIALS	STUDENT ACTIVITIES
Independent study	Files of general information for each cluster; books, films, wall charts, etc.	Fill in instructional plans. Review all available literature.

8c

SCHEDULE OF ACTIVITIES FOR SESSION #8

ASSIGNMENT FROM PREVIOUS LESSON	ASSIGNMENT FOR NEXT LESSON	NOTES
	For April 4, 6, the third group of instructional plans.	

SCHEDULE OF ACTIVITIES FOR SESSION #9

9a

WEEK OF	GROUP	OBJECTIVES	PERSONNEL	PROJECT TEAM ACTIVITIES
Apr. 4,6	Class	To present to the students an industrial demonstration on the overhead projector and accessories by the 3M Company representative.	Tues. Nevin Andy Luther Tom Thurs. Nevin Ken Ed Tom	Observe. Make suggestions as to specific applications.
	Individual groups	To develop instructional plans according to the format.		Review prepared instructional plans. Advise of information in files, films, wall charts, etc.

SCHEDULE OF ACTIVITIES FOR SESSION #9

METHODS	MATERIALS	STUDENT ACTIVITIES
Industrial demonstration	Supplied by industrial representative.	Observe. Make suggestions as to specific applications.
Independent study	Files of general information, pamphlets for each occupation; books, films, wall charts, etc.	Fill in instructional plans. Review all available literature.

SCHEDULE OF ACTIVITIES FOR SESSION #9

ASSIGNMENT FROM PREVIOUS LESSON	ASSIGNMENT FOR NEXT LESSON	NOTES
Third group of instructional plans due.	For April 18-20, fourth group of instructional plans due.	

10a

SCHEDULE OF ACTIVITIES FOR SESSION #10

WEEK OF	GROUP	OBJECTIVES	PERSONNEL	PROJECT TEAM ACTIVITIES
Apr. 11,13	Individual groups	To develop instructional plans according to the format	Tues. Nevin Andy Luther Tom Thurs. Nevin Ken Ed Tom	Review prepared instructional plans. Advise of information in files, films, etc.

SCHEDULE OF ACTIVITIES FOR SESSION #10

METHODS	MATERIALS	STUDENT ACTIVITIES
Independent study	Files of general information, pamphlets for each occupation; books, films, wall charts, etc.	Develop instructional plans. Review all available literature.

10c

SCHEDULE OF ACTIVITIES FOR SESSION #10

ASSIGNMENT FROM PREVIOUS LESSON	ASSIGNMENT FOR NEXT LESSON	NOTES
Competency inventory for summer workshop.	Fourth group of instructional plans due.	

11 a

SCHEDULE OF ACTIVITIES FOR SESSION #11

WEEK OF	GROUP	OBJECTIVES	PERSONNEL	PROJECT TEAM ACTIVITIES
Apr. 18,20	Class	To present to the students an industrial demonstration on the perceptiscope and its use by Perceptual Development Laboratories.	Tues. Nevin Andy Luther Tom Thurs. Nevin Ken Ed Tom	Observe. Make suggestions as to specific applications.
	Individual Group	To develop instructional plans according to the format,		Review prepared instructional plans. Advise of information in files, etc.

11b

SCHEDULE OF ACTIVITIES FOR SESSION #11

METHODS	MATERIALS	STUDENT ACTIVITIES
Industrial demonstration	Supplied by industrial representative	Observe. Make suggestions as to specific applications.
Independent study	Files of general information, pamphlets for each occupation; books, files, charts, etc.	

11c

SCHEDULE OF ACTIVITIES FOR SESSION #11

ASSIGNMENT FROM PREVIOUS LESSON	ASSIGNMENT FOR NEXT LESSON	NOTES
Fourth group of instructional plans due.	For May 2,4 - Fifth group of instructional plans due.	

12 a

SCHEDULE OF ACTIVITIES FOR SESSION #12

WEEK OF	GROUP	OBJECTIVES	PERSONNEL	PROJECT TEAM ACTIVITIES
Apr. 25,27	Individual groups	To develop instructional plans according to the format.	Tues. Nevin Andy Luther Tom Thurs. Nevin Ken Ed Tom	Review prepared instructional plans. Advise of information in files, films, etc.

SCHEDULE OF ACTIVITIES FOR SESSION #12

METHODS	MATERIALS	STUDENT ACTIVITIES
Independent study	Files of general information, pamphlets for each occupation; books, films, wall charts, etc.	Develop instructional plans. Review all available literature.

12c

SCHEDULE OF ACTIVITIES FOR SESSION #12

ASSIGNMENT FROM PREVIOUS LESSON	ASSIGNMENT FOR NEXT LESSON	NOTES
Competency inventory for summer workshop.	Fifth group of instructional plans due.	

SCHEDULE OF ACTIVITIES FOR SESSION

WEEK OF	GROUP	OBJECTIVES	PERSONNEL	PROJECT TEAM ACTIVITIES
May 2,4	Individual groups	To finish developing instructional plans according to format.	Tues. Nevin Andy Luther Tom	Review prepared instructional plans.
		To have students try closed loop movie projector.	Thurs. Nevin Ken Ed Tom	Advise of information in files, film, etc.

13 b

SCHEDULE OF ACTIVITIES FOR SESSION

METHODS	MATERIALS	STUDENT ACTIVITIES
Independent study	Files of general information.	Develop instructional plans.
	Pamphlets for each occupation; books, films, wall charts, etc.	Review all available literature.
	Closed loop movie projector.	

SCHEDULE OF ACTIVITIES FOR SESSION

ASSIGNMENT FROM PREVIOUS LESSON	ASSIGNMENT FOR NEXT LESSON	NOTES
Fifth group of instructional plans due.		

SCHEDULE OF ACTIVITIES FOR SESSION

WEEK OF	GROUP	OBJECTIVES	PERSONNEL	PROJECT TEAM ACTIVITIES
May 11	Grouping by Clusters	To arrange tasks in teaching sequence. To develop project ideas. To develop ideas for instructional materials to be prepared during summer session.	Nevin Ken Luther Andy Tom Ed	Coordinate discussions

SCHEDULE OF ACTIVITIES FOR SESSION

METHODS	MATERIALS	STUDENT ACTIVITIES
Group discussion	List of tasks	Finish sequencing tasks. Discuss project ideas.
Verbal description with illustration.	Calendar board	Observe and raise appropriate questions.

14 c

SCHEDULE OF ACTIVITIVES FOR SESSION

ASSIGNMENT FROM PREVIOUS LESSON	ASSIGNMENT FOR NEXT LESSON	NOTES
	Prepare list of projects. Prepare list of instructional materials to be prepared during the summer session.	

SCHEDULE OF ACTIVITIES FOR SESSION

WEEK OF	GROUP	OBJECTIVES	PERSONNAL	PROJECT TEAM ACTIVITIES
May 18	Groupings by clusters	Finish and review list of instructional materials to be prepared during summer. Tasks	Nevin Ken Luther Andy Tom Ed	To coordinate discussion.
	Class activity	To orientate students to summer activities.		To use calendar board to illustrate presentation.

15 b

SCHEDULE OF ACTIVITIES FOR SESSION

METHODS	MATERIALS	STUDENT ACTIVITIES
Group discussion	List of tasks for each occupation.	Arrange tasks according to teaching sequences. Name list of projects.

SCHEDULE OF ACTIVITIES FOR SESSION

ASSIGNMENT FROM PREVIOUS LESSON	ASSIGNMENT FOR NEXT LESSON	NOTES
List of ideas. List of materials to be prepared during summer session.		

APPENDIX E

DEMONSTRATIONS OF INSTRUCTIONAL MATERIALS

DEMONSTRATIONS OF INSTRUCTIONAL MATERIALS

DATE	INSTRUCTIONAL DEVICE	REPRESENTATIVES
Feb. 28 Mar. 2	Audio Notebook Audio Notebook	Mr. Norman Birdsall Mr. Richard Murray Electronic Futures, Inc. 2425 Wilson Boulevard Arlington, Virginia
Mar. 14	Video-Tape	Mr. Carter Kaufmann Mr. Charles Faulkner Professional Products, Inc. 4964 Fairmont Avenue Bethesda, Maryland
Mar. 30	Video-Tape	Mr. Edward Tuttle Kunz Inc. 207-209 E. Patapsco Avenue Baltimore, Maryland
Apr. 4	Overhead Projection Devices and Materials	Mr. Milo Palaggo 3M Business Products Sales, Inc. 5504 Port Royal Road Springfield, Virginia
Apr. 13	Overhead Projection Devices and Materials	Mr. John A. Gerber 3M Business Products Sales, Inc. P.O. Box 1009 Hagerstown, Maryland
Apr. 18,20	Percepto Scope	Mr. Frank J. Polich Perceptual Development Laboratories 3500 Cobb Drive Fairfax, Virginia 22030
Apr. 25,27	Autotutor	Mr. Paul Tillman The Welch Scientific Company Box 1276 Fredericksburg, Virginia

APPENDIX F

EVALUATION FORM FOR TEACHERS PARTICIPATING IN THE SPRING SEMESTER PROGRAM

EVALUATION OF TEACHERS PARTICIPATING IN THE SPRING SEMESTER PREPARATION PROGRAM

Teacher: ______________________________

Evaluators: ______________________________

____

Instructions: The teacher evaluation must be made with respect to the attainment of each objective. Read the criteria for the objective and rate the teacher's performance in the space provided along the following continuum:

0 ———————— 5 ———————— 10

The teacher was not able to effectively demonstrate the behavior stated in the criterion.	The teacher was able to effectively demonstrate the behavior stated in the criterion.

Objective A: Developing an understanding of the cluster concept as a program in vocational education at the secondary school level.

"Understanding" was demonstrated when the teacher was able to:

1. Define the cluster concept . . . . ______ ______
2. Express verbally a rationnale and need for a cluster concept program . . . . ______ ______
3. State the characteristics peculiar to the cluster concept program in vocational education . . . . ______ ______

Total evaluative rating for Objective A . . . . . ______ ______

Mean evaluative rating for Objective A . . . . . . ______

Objective B: Developing the capability of preparing objectives in behavorial terms.

Attainment of the objective was accomplished when the teacher was able to:

1. Write task and area of human requirement statements using an action verb to describe the behavior, a noun to denote the object acted upon, and a phrase which describes the result of the action on an object . . . . ______ ______
2. State the reasons for preparing objectives in behavorial terms . . . . ______ ______

Total evaluative rating for Objective B . . . . ______ ______

Mean evaluative rating for Objective B . . . . ______

Objective C: Developing an understanding of the research procedures utilized in formulating content for the occupational clusters of the program.

Attainment of the objective was attained when the teacher was able to:

1. Analyze a task from the first unit of a cluster to identify the areas of human requirement . . . . ______ ______
2. Verbally describe the procedures utilized in the identification of content for the cluster . . . . ______ ______

Total evaluative rating for Objective C . . . . ______ ______

Mean evaluative rating for Objective C . . . . ______

Objective D: Developing knowledge about the types and proper use of instructional materials for a cluster concept program.

A teacher with knowledge about the types and proper use of instructional materials was able to:

1. Locate and review instructional materials such as films, books, overlays, and charts . . . . ______ ______

2. Make a selection of instructional materials that are appropriate for clarifying the content of the cluster . . . . ______ ______

Total evaluative rating for Objective D . . . . ______ ______

Mean evaluative rating for Objective D . . . . ______

Objective E: Developing information about a range of instructional systems and teaching methods appropriate for use in a cluster concept program.

A teacher with the ability to select appropriate instructional systems and teaching methods for use in a cluster concept program was able to:

1. Identify and state the characteristics of the instructional systems and teaching methods and their implications for a cluster concept program . . . . ______ ______

2. Make a selection of instructional systems and teaching methods that are appropriate for clarifying the content of the cluster . . . . ______ ______

Total evaluative rating for Objective E . . . . ______ ______

Mean evaluative rating for Objective E . . . . ______

Objective F: Developing knowledge about a range of evaluation methods and the proper utilization of these methods.

A teacher with knowledge about the evaluation methods and their proper utilization in a cluster concept program was able to:

1. Identify and state the characteristics of various evaluation methods . . . . ______ ______

2. Make a selection of evaluation methods that are appropriate for measuring the performance of the tasks and areas of human requirement in each occupational cluster . . . . ______ ______

Total evaluative rating for Objective F . . . . ______ ______

Mean evaluative rating for Objective F . . . . ______

APPENDIX G

TASK EXPERIENCE INVENTORY

Sample Inventory

University of Maryland

Department of Industrial Education

Cluster Concept Project

Task Experience Inventory

* * * * * * * * * * * * * * * * * *

Directions

The following is a listing of the Level I and Level II tasks in the Occupational Cluster you will be teaching. We are interested in determining what additional experience (if any) you will need in order to successfully teach these tasks.

In the space provided, place an "A" if your experience is adequate to teach the task; place a "L" if your experience with the task is limited; and place an "I" if your present experience is inadequate to teach the task.

"A" - Adequate experience

"L" - Limited experience

"I" - Inadequate experience

Home Appliance Servicing

_____ 1. Observing the symptoms to determine the defect (s) in small heating element appliances.

_____ 2. Disassembling small heating element appliances for testing and repairing.

_____ 3. Isolating the defect to a particular section of the heating element appliance.

_____ 4. Isolating the defect to a particular component of the heating element appliance.

_____ 5. Replacing the defective part (s) of small heating element appliances.

_____ 6. Testing the operations of the repaired small heating element appliance.

_____ 7. Reassembling the repaired small heating element appliance.

_____ 8. Retesting the assembled small heating element appliance.

_____ 9. Observing the symptoms to determine the defect (s) in small motor driven appliances.

_____10. Disassembling small electric motor appliances for testing and repairing.

_____11. Isolating the machanical defects to a particular section of the small electric motor appliances.

_____12. Isolating the electrical defect (s) to a particular section of the small electric motor appliances.

_____13. Isolating the defect to a particular component of the small electric motor appliance.

_____14. Replacing the defective part (s) of the small electric motor appliances.

_____15. Testing the operation of the repaired small electric motor appliances.

_____16. Reassembling the repaired small electric motor appliance.

_____17. Retesting the repaired small electric motor appliances.

_____18. Connecting the electrical supply to the electric range in the home.

_____19. Checking the installation of the electric range and making any final adjustments necessary.

_____20. Explaining the operation of the electric range to the customer.

_____21. Installing the vent system for the automatic dryer in the home.

_____22. Connecting the electrical supply to the automatic dryer in the home.

_____23. Testing the installation of the automatic dryer and making any final adjustments necessary.

_____24. Explaining the operation of the automatic dryer to the customer.

_____25. Connecting the water supply to the automatic washer in the home.

_____26. Connecting the electrical supply to the automatic washer in the home.

_____27. Checking the installation of the automatic washer and making any final adjustments necessary.

_____28. Explaining the operation of the automatic washer to the customer.

_____29. Connecting the electrical supply to the refrigerator in the home.

_____30. Checking the installation of the refrigerator and making any final adjustments necessary.

_____31. Explaining the operation of the refrigerator to the customer.

_____32. Observing the symptoms to determine the defect (s) in an automatic washer.

_____33. Disassembling the automatic washer in order to make the necessary repair (s).

_____34. Isolating the electrical defect (s) to a particular section of the automatic washer.

_____35. Isolating the mechanical defect (s) to a particular section of the automatic washer.

_____36. Isolating the defect (s) to a particular component in an automatic washer.

_____37. Replacing the defective part (s) of the automatic washer.

_____38. Repairing the defective part (s) of the automatic washer.

_____39. Reassembling the repaired automatic washer.

_____40. Testing the operation of the automatic washer.

_____41. Making any final adjustments to the repaired automatic washer.

_____42. Retesting the assembled automatic washer.

_____43. Observing the symptoms to determine the defect (s) in an automatic electric dryer.

_____44. Isolating the electrical defect (s) to a particular section of the automatic electric dryer.

_____45. Isolating the mechanical defect (s) to a particular section of the automatic electric dryer.

_____46. Disassembling the automatic electric dryer in order to make the necessary repair (s).

_____47. Isolating the defect (s) to a particular component in an automatic electric dryer.

_____48. Replacing the defective part (s) of the automatic electric dryer.

_____49. Repairing the defective part (s) of the automatic electric dryer.

_____50. Reassembling the repaired automatic electric dryer.

_____51. Testing the operation of the automatic electric dryer.

_____52. Making any final adjustments to the repaired automatic electric dryer.

_____53. Retesting the assembled automatic electric dryer.

_____54. Observing the symptoms to determine the defect (s) in a refrigerator.

_____55. Disassembling the refrigerator in order to make the necessary repair (s).

_____56. Isolating the electrical defect (s) to a particular section of the refrigerator.

_____57. Isolating the mechanical defect (s) to a particular section of the refrigerator.

_____58. Isolating the defect (s) to a particular component in a refrigerator.

_____59. Replacing the defective part (s) of the refrigerator.

_____60. Repairing the defective part (s) of the refrigerator.

_____61. Reassembling the repaired refrigerator.

_____62. Testing the operation of the refrigerator.

_____63. Making any final adjustments to the repaired refrigerator.

_____64. Retesting the assembled refrigerator.

_____65. Observing the symptoms to determine the defect (s) in an electric range.

_____66. Isolating the electrical defect (s) to a particular section of the electric range.

_____67. Disassembling the electric range in order to make the necessary repair (s).

_____68. Isolating the mechanical defect (s) to a particular section of the electric range.

_____69. Isolating the defect (s) to a particular component in an electric range.

_____70. Replacing the defective part (s) of the electric range.

_____71. Repairing the defective part (s) of the electric range.

_____72. Reassembling the repaired electric range.

_____73. Testing the operation of the electric range.

_____74. Making any final adjustments to the repaired electric range.

_____75. Retesting the assembled electric range.

Business Machine Servicing

_____ 1. Observing the symptoms to determine the defects in a typewriter.

_____ 2. Disassembling the typewriter for cleaning.

_____ 3. Cleaning typewriter to remove dirt.

_____ 4. Isolating the mechanical defects to a particular section of the typewriter.

_____ 5. Isolating the electrical defect (s) to a particular component of the typewriter.

_____ 6. Isolating the mechanical defect (s) to a particular component of the typewriter.

_____ 7. Removing the defective part (s) of the typewriter.

_____ 8. Replacing the defective part (s) of the typewriter.

_____ 9. Reassembling the repaired typewirter.

_____10. Testing the operation of the repaired typewriter.

_____11. Disassembling the calculator for cleaning.

_____12. Disassembling the adding machine for cleaning.

_____13. Cleaning the adding machine to remove dirt.

_____14. Removing the defective part (s) of the adding machine.

_____15. Replacing the defective part (s) of the adding machine.

_____16. Reassembling the repaired adding machine.

_____17. Testing the operation of the repaired adding machine.

Radio and Television Servicing

_____ 1. Observing the symptoms to determine the defective stage of the radio.

_____ 2. Checking the tubes in the suspected defective stage of the radio.

_____ 3. Removing the chassis from the cabinet for ease of servicing.

_____ 4. Isolating the defective components in a particular stage of the radio.

_____ 5. Replacing the defective components in a particular stage of the radio.

_____ 6. Replacing the chassis in the cabinet after a final inspection of the radio.

_____ 7. Making final operational checks and adjustment to the radio.

_____ 8. Observing the symptoms to determine the defective stage of the television set.

_____ 9. Checking the tubes in the suspected stage.

_____10. Removing the chassis from the cabinet for ease of servicing.

_____11. Isolating the defective components in a particular stage of the television set.

_____12. Replacing the defective components in a particular stage of the television set.

_____13. Replacing the chassis in the cabinet after a final inspection of the television set.

_____14. Making final operational checks and adjustment to the television set.

_____15. Installing an outdoor television antenna and transmission line.

Air Conditioning & Refrigeration Servicing

_____ 1. Installing tubing between case and condensing unit.

_____ 2. Testing lines with detection device for leaks.

_____ 3. Installing gages on condensing unit to charge the unit with refrigerant.

_____ 4. Evacuating the entire system with a vacuum pump to remove all non-condensibles.

_____ 5. Removing the cover from the unit for ease of servicing.

_____ 6. Replacing the defective components in the refrigeration unit.

_____ 7. Replacing the cover on the unit to restore to the original condition.

APPENDIX H

INSTRUCTIONAL MATERIALS DEVELOPED BY THE TEACHER-TRAINEES

INSTRUCTIONAL MATERIALS DEVELOPED BY TEACHERS IN THE ELECTRO-MECHANICAL INSTALLATION AND REPAIR CLUSTER

Donald Campbell

1. Occupational information unit for radio and television repairman.

2. Set of transparencies illustrating block diagrams of television circuits.

3. Charts illustrating resistor color codes.

Morris Lay

1. Occupational information unit for home appliance serviceman.

2. Set of transparencies illustrating refrigeration cycle.

3. Mock-up of a compressor.

John Millett

1. Occupational information unit on business machine repairman.

2. Set of transparencies illustrating key operating mechanisms for typewriters.

INSTRUCTIONAL MATERIALS DEVELOPED BY TEACHERS IN THE CONSTRUCTION CLUSTER

James Mason

1. Occupational information unit for electrician.

2. Slide sequence of building practices.

3. Set of Transparencies illustrating plumbing fittings and installations.

4. Visual aid illustrating electrical terminology.

5. Drawings and blueprints for a utility building.

Paul Imphong

1. Occupational information unit for carpenter.
2. Mock-up illustrating pipe caulking.
3. Slide sequence of building practices.
4. Plans for teaching unit to install water closet.
5. Drawings and blueprints for a corner section of a house.

John Burrell

1. Occupational information unit for mason.
2. Symbol chart for building materials.
3. Transparencies showing dimensions of brick and combinations for varying wall thicknesses.
4. Set of transparencies illustrating steps in laying out corners of a building site.
5. Drawings and blueprints for a bus stop shelter.

Charles Barton

1. Occupational information for carpenter.
2. Model of truss construction.
3. Model of wall framing construction.
4. Transparencies of wiring details.
5. Drawings and blueprints for a combination play-house and storage shed.

INSTRUCTIONAL MATERIALS DEVELOPED BY TEACHERS IN THE METAL FORMING AND FABRICATION CLUSTER

Porter Harrison

1. Occupational information unit for sheet metal worker.
2. Display or various types of sheet metal joints.

3. Transparency illustrating the steps involved in forming a Pittsburgh lock.

4. Charts illustrating types of rivets, parts of a rivet, and a formed rivet.

Harold Slimmer

1. Occupational information unit for assembler.

2. Display of various types of fasteners.

3. Charts illustrating cutting fluids for various metals, and the melting points of metals.

4. Transparencies illustrating various metal working processes.

William Stewart

1. Occupational information unit for machinist.

2. Set of transparencies illustrating safety procedures.

3. Set of transparencies illustrating lathe operating procedures.

4. Chart illustrating cutting speeds and formulas for machine tools.

5. Models illustrating steps in grinding a lathe tool.

Truman Doyle

1. Occupational information unit for welder.

2. Charts illustrating common welding joints.

3. Display of welded joints.

4. Set of transparencies on welding blueprint reading.

5. Set of slides on metal forming and fabricating processes.

APPENDIX I

EVALUATION FORM FOR TEACHERS PARTICIPATING IN THE SUMMER WORKSHOP SESSION

EVALUATION OF TEACHERS PARTICIPATING IN THE SUMMER WORKSHOP PREPARATION PROGRAM

Teacher: ______________________________

Evaluators: ______________________________

____

Instructions: Evaluate each teacher according to his performance of the objectives listed below. The evaluation should be made by using the criterion statements to rate the teacher along the continium provided below each objective.

* * * * * * * * * * * * * * *

I. Preparing an occupational information unit for an occupation in the cluster.

0 ______________________ 5 ______________________ 10

The unit was poorly prepared. Absence of important information, lack of resources, local individuals, literature, and other materials, little imagination used in methods for providing information to students.	The unit was well prepared. Important information provided and documented. Variety of resources including local individuals, literature, and other materials, imagination and planning used in methods for providing information to students.

2. Development of visual aids for use in teaching the occupational cluster.

Visual Aid #1

0 5 10

Visual aid displayed little imagination or planning and was poorly made.	Visual aid displayed imagination, good planning, and was well made.

Visual Aid #2

0 5 10

Visual Aid #3

0 5 10

Mean Evaluation

0 5 10

3. Preparation of drawings and blueprints for instructional purposes (only teachers for the construction cluster and metal-forming and fabrication cluster).

0 5 10

Projects presented in the drawings were not suitable for the cluster concept program. Drawings were not prepared according to industrial specifications. Prints were poorly made and difficult to read.	Projects presented in the drawings were well suited for the cluster concept program. Drawings were prepared according to industrial specifications and prints were well made and easy to read.

APPENDIX J

EVALUATION FORM FOR SUMMER WORKSHOP PROGRAM

University of Maryland

Department of Industrial Education

Cluster Concept Project

Evaluation of the Teacher Preparation Program

* * * * * * * * * * * * * * *

Directions:

We are pleased that you have taken the time to visit our teacher-preparation program and that you were willing to be a member of the evaluation team. On the following pages are some statements describing the effectiveness of the program. You are asked to complete all of the following statements by placing an X next to the phrase which is most appropriate. The best answer to each statement is dependent on your personal observation and your personal opinion.

I. Mechanics and Organization

A. Physical Facilities

1. The space and physical facilities provided for teachers in the workshop were:

____ inadequate; there were not enough desks, chairs, or worktables available.

____ limited; enough desks, chairs and worktables available but crowded conditions existed.

____ work space was adequate; there was a separate room available for study and storage.

____ plenty of work space for each member of the cluster concept team; everyone had a desk, chair, and work area.

2. The facilities and equipment of the consulting agencies participating in the skill development program indicated:

____ machines and equipment needed repair.

____ machines and equipment outdated.

____ machines and equipment in running condition and were well maintained.

____ recently acquired machines and equipment all in excellent running order.

B. Resource Material

1. The reference materials intended for the participants in the teacher preparation program were:

____ impossible to locate.

____ difficult to locate and outdated.

____ available to all cluster concept teachers and were beneficial in the preparation of instructional materials.

2. In providing for the development of instructional aids, the program was:

____ a poor source for help.

____ not prepared to offer useful information.

____ organized at times.

____ always well organized with an abundance of materials and useful information.

C. Program Operation

1. The operation of weekly programs was:

____ run in a haphazard manner which appeared to be confusing and unorganized.

____ unorganized at times and occasionally running smoothly.

____ organized in such a manner that permitted the attainment of the basic objectives.

____ very efficient with everything running smoothly and directed to meet all the objectives.

2. The summer workshop was operated in the following manner:

____ little preparation evident.

____ instructions prepared some of the time.

____ staff and cluster concept teachers prepared most of the time.

____ staff members and industrial consultants were always well prepared.

D. Length of Time

1. To meet its expressed objectives, the length of the summer workshop was:

____ much too short; couldn't accomplish enough in daily sessions to make the program worthwhile.

____ limited; cluster concept teachers were rushed through all phases of the program.

____ adequate; cluster concept teachers were able to finish each phase of the program on time.

____ there was more than enough time to meet expressed objectives.

2. The amount of time allotted for individual study and work activities was:

____ much too short.

____ inadequate to do a worthwhile job on individual assignments.

____ sufficient fo finish each assignment on time.

____ more than enough to complete the required assignment.

II. Process and Staff

A. Workshop Consultants

1. The technical competencies of the consultants in the cooperating agencies were:

____ inadequate to be of benefit to the cluster concept teachers.

____ quite minimal considering the objectives of the workshop.

____ adequate; very helpful to the teachers.

____ excellent; enabled the workshop to surpass the standards set by the objectives.

2. The ideas for implementation of the cluster concept program developed from the occupational experiences provided by the consultants were:

____ inadequate to satisfactorily meet the expressed objectives of the workshop in this area.

____ limited; of such a nature that only some of the objectives of the workshop were met.

____ organized and presented in a manner that was of great benefit to the cluster concept teachers.

____ excellent; more than enough to meet the expressed objectives of the program.

3. The procedures used to evaluate the cluster concept teachers on their level of skill competency were:

____ inadequate, unorganized.

____ lacked evidence of much organization.

____ adequate; organized and structured for completeness.

____ excellent; well organized and administered.

B. Organization

1. The project staff-participant ratio was:

____ inadequate to work with in all situations.

____ adequate in some situations.

____ satisfactory at all times.

____ more than adequate; a staff member was always available for assistance.

2. The organization of the workshop was:

____ a conglomeration of unrelated ideas put into practice.

____ at times haphazard.

____ arranged in a manner that was beneficial to the program.

____ well planned; directed to meet all the objectives.

3. The consultant-teacher ratio was:

____ inadequate to work with.

____ adequate in some situations.

____ satisfactory at all times.

____ more than adequate; one resource consultant was always available for assistance.

4. The project staff was:

____ irresponsible and unreliable.

____ usually busy working on projects of their own.

____ organized and presented their material with enthusiasm.

____ provided highly systematic and valuable experiences.

C. Workshop Continuity

1. The sequence followed in the operation of the workshop was:

____ inadequate to meet the objectives of the workshop; arranged in an unsatisfactory manner.

____ so arranged that it limited the achievement of some of the objectives of the workshop.

____ adequate to meet the objectives of the workshop; showed good organization.

____ more than adequate to meet the objectives of the workshop; organized in a manner that reflected excellent planning and thought.

2. The experiences provided by the program:

____ appeared to have no relationship to the objectives of the program.

____ were related at times to the objectives of the program.

____ were systematic and aided in the achievement of program objectives.

____ were excellent with organization and relationships always apparent.

3. The continuity of the program provided:

____ inadequate direction to meet the objectives of the program.

____ limited direction to meet the objectives of the program; sketchy relationships to most activities.

____ good direction for meeting program objectives and adequate relationships to the activities of the program.

____ a smoothly operated program with indications that the cluster concept teachers would have no difficulty in implementing the cluster concept program.

III. Individual Growth

A. Development of Competencies

1. The occupational experiences provided by the consultants were:

____ inadequate to develop competencies.

____ acceptable but many teachers still feel insecure in some areas of the occupations they will teach; limited in overall effectiveness.

____ quite adequate for the development of competencies; extensive enough to give the teachers a feeling of security in teaching the occupational tasks.

____ of excellent quality and developed highly competent teachers.

2. The technical information provided by the consultants was:

____ inadequate to satisfactorily meet the expressed objectives of the program in this area.

____ of such a quality that only some of the objectives of the program could be met.

____ well organized and presented; met the objectives of the workshop.

____ excellent in quality and quantity; more than enough to meet the expressed objectives of the workshop.

3. The instructional materials developed by the cluster concept teachers for teaching the cluster concept project were:

____ inadequate for the purpose in which they were developed.

____ acceptable but limited in value.

____ adequate; well organized and detailed.

____ excellent; through and complete.

4. Using the objectives as a criteria, the program was:

____ inadequate to satisfactorily meet the expressed objectives.

____ somewhat limited as a means of preparing the cluster concept teacher for the implementation of the program.

____ organized in a manner that permitted the achievement of all objectives of the program.

____ excellent in quality; more than met the expressed objectives of the program.

B. Personal-Social Relations

1. The workshop atmosphere was friendly and congenial:

____ at no time.

____ sometimes; democratic to an extent.

____ frequently; usually democratic.

____ always; observed democratic procedures at all times.

2. Group sessions of the workshop staff and participants observed democratic procedures:

____ very few times; poor relationship among staff and teachers.

____ occasionally; satisfactory relationship among staff and teachers.

____ frequently; good working relationship among staff and teachers.

____ always; excellent relationship between staff, consultants and participants.

C. Individual Participation

1. Each of the participants was actively engaged in the workshop activities as characterized by the following statements:

____ none; no opportunities for participation.

____ sometimes; few opportunities for active participation.

____ frequently; more opportunities for self expression and individual participation.

____ always; many opportunities for self expression and participation.

2. The opportunities for self expression were characterized as follows:

____ the program provided pratically no opportunities for self expression.

____ there were limited opportunities for self expression.

____ several opportunities for self expression.

____ always opportunities for self expression.

3. As an educational activity to better prepare the cluster concept teachers to implement the cluster concept program in the public schools, this workshop was:

____ too shallow to make teachers feel comfortable about teaching many of the tasks in the occupations.

____ acceptable but many teachers still feel insecure in some areas of the occupations they will teach.

____ quite adequate for the development of competencies; extensive enough to give the teachers a feeling of security in teaching the occupational tasks.

____ of excellent quality and developed highly competent teachers; experiences highly satisfying and generally considered to be more than adequate for the achievement of the objectives of the program.

What impressed you most in this workshop?

What suggestions can you make to improve the quality of the workshop?

APPENDIX K

LIST OF CONSULTANTS

LIST OF CONSULTANTS

Mr. Robert Anger
Westinghouse Appliance Sales
& Service Center
Washington Boulevard & Gorman Road
Laurel, Maryland

Mr. Buck Baker, Director
National Joint Apprenticeship &
Training Committee for the
Electrical Industry
1200 18th Street, N.W.
Washington 6, D.C.

Mr. Harry Bickford
Fabrication Division
Goddard Space Flight Flight
Greenbelt, Maryland

Mr. Norman Birdsall
Electronic Futures, Inc.
2425 Wilson Boulevard
Arlington, Virginia

Mr. Paul Blank
Cee Bee Contractors, Inc.
5606 Marlboro Pike
Hillside, Maryland

Mr. E. I. Borlang
National Training Center
Sylvania Electric Products, Inc.
700 Ellicott Street
Batavia, New York

Mr. Frank Bowen
Drake Contracting Company, Inc.
Enterprise Road
Mitchellville, Maryland

Lt. Col. Robert E. Brennan
Suburban Maryland Home Builders Association
9517 Georgia Avenue
Silver Spring, Maryland

Mr. Joseph Bryan
Bryan and Associates, Inc.
3009 20th Street, N.E.
Washington, D.C.

Mr. John A. Burton
Manager
Custom Engineering
Remington Rand Office Machines
333 Wilson Avenue
South Norwalk, Connecticut

Dr. Kinneth M. Chambliss
Associate Professor
Industrial Education Department
University of Maryland
College Park, Maryland

Mr. Richard Connors
Executive Secretary
Associated Builders & Contractors
912 Thayer Avenue
Silver Spring, Maryland

Mr. Joseph P. Corcoran, Director
Training Department for Apprentices
  and Journeymen
United Association of Journeymen
  of the Plumbing and Pipefitting
  Industry of the United States and Canada
901 Massachusetts Avenue, N.W.
Washington, D.C.

Dr. William A. Duval, Director
Department of Apprenticeship & Training
Brotherhood of Painters, Decorators &
  Paperhangers of America
1925 K Street, N.W.
Washington, D.C.

Mr. Hugh Engleton
National Association of Homebuilders
  Laboratories
Rockville, Maryland

Mr. Henry Ernst
Fabrication Division
Goddard Space Flight Center
Greenbelt, Maryland

Mr. Charles Faulkner
Professional Products, Inc.
4964 Fairmont Avenue
Bethesda, Maryland

Mr. John A. Gerber
3M Business Products Sales, Inc.
P.O. Box 1009
Hagerstown, Maryland

Mr. Howard Grayson
H.R. Grayson & Son, Inc.
2655 Firth Sterling Avenue, S.E.
Washington, D.C.

Dr. Trudy M. Hamby
Assistant Professor
Institute for Child Study
University of Maryland
College Park, Maryland

Mr. William G. Huelin
District Service Manager
Westinghouse Sales & Service Center
Laurel, Maryland

Mr. Wiley Jenkins
Fabrication Division
Goddard Space Flight Center
Greenbelt, Maryland

Mr. Donald A. Jewesak
District Service Manager
Sylvania Electric Products
7819 Yorktown Drive
Alexandria, Virginia

Mr. Carter Kaufmann
Professional Products, Inc.
4964 Fairmont Avenue
Bethesda, Maryland

Mr. Burt Kelbaugh
Fabrication Division
Goddard Space Flight Center
Greenbelt, Maryland

Mr. Charles Kettler
Kettler Brothers Builders, Inc.
4701 42nd Street, N.W.
Washington, D.C.

Mr. Irving Kidwell
Kidwell & Kidwell, Inc.
5500 Branchville Road
Branchville, Maryland

Mr. Maurice Levinshon
Chief
Fabrication Division
Goddard Space Flight Center
Greenbelt, Maryland

Mr. Robert E. Miller
Manager
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